Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

April 15, 2009

Mr. Vojin Janjic , Permit Writer
Tennessee Department of Environment & Conservation
Division of Water Pollution Control
Sixth Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243-1534

Dear Sir:

WATTS BAR NUCLEAR PLANT (WBN) - NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT NO. TN0020168- REQUEST FOR RAW WATER TREATMENT MODIFICATION.

In accordance with the NPDES permit, Part III, G, WBN respectfully requests an amendment to the current raw water treatment plan to include a change in suppliers of our water treatment products. Chemicals previously approved under the former vendor may continue to be used. The new suppliers products are "similar" products containing "essentially the same chemical" as products previousely approved by the Division. The processes and frequencies of applying the products will not change. In addition, the discharge concentrations of the replacement chemicals will remain the same as the currently approved chemicals to ensure the same high level of protection for aquatic life in the Tennessee River while increasing the flexibility of plant equipment options. Finally, WBN respectively requests the Division's approval no later than June 1, 2009 in order for the site to begin summer treatments with the new vendor's chemicals. GE Betz will be assuming responsibilities for TVA's Raw Water Treatment program from Nalco no later than June 30, 2009.

Enclosed for your review and consideration are the following tables: (1) the Raw Water Chemical Additives, proposed chemicals as well as those currently in use (depicted in parenthesis and/or footnote), (2) the Raw Water Application Guide, (3) Calculations Showing the Worst Case Scenario, and (4) Product Toxicity Data Summary and Comparison with Maximum Instream Wastewater Concentrations (IWC). For your convenience, WBN has enclosed a summary of the Raw Water Treatment Programs, a Treatment Plan Overview and

C001
NRR

Toxicity Summaries. Finally, a MSDS for each product with an accompaning Product Bulletin have been provided.

WBN is confident that these change requests to the raw water treatment program will allow the same high level of protection for aquatic life in the Tennessee River while increasing the flexibility of plant equipment treatment options.

Should you need additional copies, or have comments or questions, contact me at (423.365.8016) or by email at djhutchison@tva.gov, or Jerri Phillips of my staff at (423.365.3576) or by email at jlphillips@tva.gov.

I certify under penalty of law that I have personally examined and am familiar with the information submitted, and based on my inquiry of those individuals immediately responsible for obtaining information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Sincerely,

Darrin Hutchison
Chemistry/Environmental Technical Support Manager

Enclosures

Cc:

Dr. Richard Urban
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L. P. Johnson, LP 5D-C
G.R. Signer, WT 6A-K
EDMS, WT CA-K (enclosure)

Raw Water Chemical Additives at Watts Bar Nuclear Plant[1] - 2009

PRODUCT	PURPOSE	FREQUENCY of Discharge	ACTIVE INGREDIENTS	% ACTIVE INGREDIENT	REPRESENTATIVE AQUATIC TOXICITY /DESCRIPTOR	DISCHARGE CONCENTRATION[1]
					(ppm active ingredients)	(ppm active ingredients)
Flogard MS6209[2] (replaces MSW-109)[5]	Iron Corrosion Inhibition	Continuous (river temp ≥ 60°F)	Zinc Chloride; Orthophosphate	12 Zinc 52 Phosphate	Steam Electric Guidelines for Zn =1.0 Zn acute and chronic WQC = 0.120 No applicable standards for P 7-d IC_{25} = 1.22 (C. dubia) 7-d IC_{25} = 3.2 (P. promelas)	<0.2 Total Zinc <0.2 Total P
Depositrol PY5200 (replaces Nalco 73200)[5]	Dispersant to facilitate iron corrosion inhibition	Continuous	Copolymer	30	7-d IC_{25} = 161 (C. dubia) 7-d IC_{25} = 600 (P. promelas)	<0.2
Inhibitor AZ8100 (replaces Nalco 1336)[5]	Copper Corrosion Inhibition	Periodic	Sodium Tolyltriazole	50	7-d IC_{25} = 10 (C. dubia) 7-d IC_{25} = 28 (P. promelas)	<0.25
Sprectrus BD1500 (replaces Nalco 73551)[5]	Surfactant to facilitate oxidizing biocides	Periodic	Nonionic Surfactant	15	7-d IC_{25} = 98 (C. dubia) 7-d IC_{25} = 450 (P. promelas)	<2.0
Towerbrom 60m (replaces Towerbrom 960)[5]	Oxidizing Biocide (Chlorination)	Periodic	Sodium Bromide & Sodium Dichloroisocyanurate	96	48-h LC_{50} = 2.43 (D. magna) 48-h LC_{50} = 0.679 (P. promelas)	0.10 Chlorine (Total Residual)
Spectrus OX1200 (replaces Nalco 901G)[5]	Oxidizing Biocide (Chlorination)	Continuous	Bromo-Chloro, Dimethyl Hydantoin (BCDMH)	96	48-h LC_{50} = 0.45(D. magna) 96-h LC_{50} = 2.25(P. promelas)	0.10 Chlorine (Total Residual)
Spectrus DT1404 (replaces Nalco CA-35)[5]	De-chlorination	Periodic[3]	Sodium Bisulfite	38	48-h Static screen = 760 (D. magma)	<10
Spectrus CT1300[4] (replaces H150M)[5] -OR-	Non Oxidizing Biocide (Mollusk Control)	Periodic	Alkyl Dimethyl Benzyl Ammonium Chloride (ADBAC)	50	7-d IC_{25} = 0.049 (C. dubia) 7-d IC_{25} = 0.130 (P. promelas)	<0.001 active ingredient in stream after mixing <0.05 measured in effluent

Raw Water Chemical Additives at Watts Bar Nuclear Plant - 2009
(continued)

PRODUCT	PURPOSE	FREQUENCY of Discharge	ACTIVE INGREDIENTS	% ACTIVE INGREDIENT	REPRESENTATIVE AQUATIC TOXICITY /DESCRIPTOR	DISCHARGE CONCENTRATION[1]
					(ppm active ingredients)	(ppm active ingredients)
Spectrus NX1104[4] (replaces Spectrus NX104)[5]	Non Oxidizing Biocide (Mollusk Control)	Periodic	Dimethylbenzylammonium Chloride & Dodecylguanidine Hydrochloride	8 Quat 5 DGH	3 brood IC_{25}=0.004 (C. dubia) 7-d IC_{25}=0.048 (P. promelas)	<0.001 total active ingredients in stream after mixing <0.031 quaternary ammonium compound measured in effluent
Bentonite Clay[5]	Detoxification of non oxidizing biocides	Periodic[3]	Sodium Silicate (Bentonite Clay)	100	No toxicity data available. No treatment standards applicable. An industry standard for detoxification.	<10
Liquid Bleach[5]	Oxidizing Biocide (Chlorination)	Continuous	Sodium Hypochlorite	12.5	24-h LC_{50}=0.005 (C. dubia) 48-h LC_{50}=0.032 (D. magna) 96-h LC_{50}=0.080 (P. promelas)	0.10 Chlorine (Total Residual)

1. The maximum discharge concentration is indicated EXCEPT where noted. Concentrations are achieved through a combination of dilution and dechlorination with sodium bisulfite or detoxification with bentonite clay.
2. Supplemental Condenser Cooling Water (SCCW) and River flow conditions have a significant impact on these discharge concentrations. Please see Rationale for this product.
3. Dechlorination and detoxification chemicals are applied as needed to ensure the discharge limitations identified in this table are met.
4. Non-oxidizing biocide treatments are not applied at the same time as oxidizing biocide treatments.
5. Denotes chemicals previousely approved by the Division.

Raw Water Chemical Application Guide[1]

Product	Injection Point	Max Feed (ppm)	In Plant Target (ppm)	Frequency of Application	Average Duration of Application.	Estimated Max Days per Year	Maximum Daily Usage (lbs)[2]
Flogard MS6209	IPS	0.3	0.2	Daily	Daily	365	200[3]
Depositrol PY5200	IPS	0.3	0.3	Daily	Daily	365	200
Inhibitor AZ8100	Specific HXs	20	5-20	10 / year	2 days	20	2,200
Spectrus BD1500 (Routine App)	IPS	5	1-2	204 days per year	0.5 hrs/day	204	70
Spectrus BD1500 (CT App)	Cooling Towers	5	1-2	26 days per year	0.25 hrs/day	26	415
Towerbrom 60m[4] (Routine App)	IPS (as a backup for BCDMH)	5	0.3-2	300 days per year	24 hrs	300	2,375
Towerbrom 60m[4] (CT App)	CT Basin	20	0.8-2	52 days per year	4 hours[4]	52	2,200
Spectrus OX1200[4] (Routine App)	IPS	5	0.3-2	300 days per year	24 hours	300	2,375
Spectrus DT1404 (CT App)	CT Basin Discharge. Weirs	10	1.3-3.3	26 days per year	4 hours	26	5,615
Spectrus DT1404 (24 hr/day Chlorination)	CT Basin Discharge. Weirs	10	0.4-3.3	2 / year	30 days	100	22,450
Spectrus CT1300	IPS[6]	5	0.5-3	26 / year	2 days	56	1,190
Spectrus NX 1104[5]	IPS[6]	3	0.5-3	26 / year	2 days	56	1,190
Bentonite clay	CT Basin Discharge. Weirs	10	2-10	26 / year	2.2 days	56	11,990
Liquid Bleach	IPS	5	0.3-2	300 days per year	24 hours	300	2,375
Liquid Bleach	CT Basin	20	0.8-2	52 days per year	4 hours	52	2,200

Raw Water Chemical Additives at Watts Bar Nuclear Plant - 2009[1]
(continued)

1. Concentrations and usage are expressed for the active ingredient(s) shown on the first page of this plan.
2. Maximum Daily Usage provides an indication of loading in the receiving stream. It is the maximum amount of active ingredients for the worst case scenario of flow and feed concentration being proposed plus a 10% margin of error. WBN will track daily usage and will request a change to this plan should an increase in maximum daily usage become necessary for the continued safe operation of the plant.
3. 200 pounds for zinc and 200 pounds for phosphorous.
4. Towerbrom 60m and Spectrus OX1200 are 96% active products each producing 57% free halogen (chlorine or bromine). Actual loading to the river for chlorine when WBN is dechlorinating the effluent is essentially zero and chlorine will always be < NPDES permit limits at NPDES discharge points.
5. 1,190 lbs for the sum of both quaternary amines in this product.
6. Molluscicides are primarily injected at the Intake Pumping Station (IPS), however, some exceptions do exist for small sections of piping such as the Essential Raw Cooling Water (ERCW) cross ties for molluscicide injection.

Calculations Showing Worst Case Scenario (final values rounded to the nearest 5 lbs)

MS6209	0.3 mg	1 lb	50,000 gal	3.785 l	60 min	24 hr	1.10	**= 200 lbs Zn and 200 lbs P per day**
0.3 ppm active	l	454,000 mg	min	gal	1 hr	day		
PY5200	0.3 mg	1 lb	50,000 gal	3.785 l	60 min	24 hr	1.10	**= 200 lbs PY5200**
0.3 ppm active	l	454,000 mg	min	gal	1 hr	day		
AZ8100	20 mg	1 lb	50,000 gal	3.785 l	60 min	4 hr	1.10	**= 2,200 lbs AZ8100**
20 ppm active	l	454,000 mg	min	gal	1 hr	day		
BD1500	5 mg	1 lb	50,000 gal	3.785 l	60 min	0.5 hr	1.10	**= 70 lbs BD1500 (Rtn App)**
5 ppm active	l	454,000 mg	min	gal	1 hr	day		
BD1500[1]	5 mg	1 lb	9,000,000 gals	3.785 l			1.10	**= 415 lbs BD1500 (CT App)**
5 ppm active	l	454,000 mg		gal				
TowerBrom 60m	5 mg	1 lb	36,000 gal	3.785 l	60 min	24	1.10	**= 2,375 lbs TowerBrom (Rtn App)**
5 ppm active	l	454,000 mg	min	gal	1 hr	day		
TowerBrom 60m[1]	20 mg	1 lb	12,000,000 gals	3.785 l			1.10	**= 2,200 lbs TowerBrom (CT App)**
20 ppm active	l	454,000 mg		gal				
Spectrus OX1200	5 mg	1 lb	36,000 gal	3.785 l	60 min	24	1.10	**= 2,375 lbs OX1200 G (Rtn App)**
5 ppm active	l	454,000 mg	min	gal	1 hr	day		
DT1404	10 mg	1 lb	170,000 gals	3.785 l	60 min	6 hrs	1.10	**= 5,615 lbs DT1404 (CT App)**
10 ppm active	l	454,000 mg	min	gal	1 hr	day		
DT1404	10 mg	1 lb	170,000 gal	3.785 l	60 min	24 hr	1.10	**= 22,450 lbs DT1404 (Dechlor)**
10 ppm active	l	454,000 mg	min	gal	1 hr	day		
CT1300	3 mg	1 lb	30,000 gal	3.785 l	60 min	24 hr	1.10	**= 1,190 lbs SPECTRUS CT1300 (quat)**
3 ppm active	l	454,000 mg	min	gal	1 hr	day		
NX 1104	3 mg	1 lb	30,000 gal	3.785 l	60 min	24 hr	1.10	**= 1,190 lbs Spectrus NX 1104 (quat)**
3 ppm active	l	454,000 mg	min	gal	1 hr	day		
Bentonite Clay[2]	10 mg	1 lb	90,000 gal	3.785 l	60 min	24 hr	1.10	**= 11,190 lbs Bentonite Clay**
10 ppm active	l	454,000 mg	min	gal	1 hr	day		
Liquid Bleach	5 mg	1 lb	36,000 gal	3.785 l	60 min	24	1.10	**= 2,375 lbs Liquid Bleach (Rtn App)**
5 ppm active	l	454,000 mg	min	gal	1 hr	day		
Liquid Bleach	20 mg	1 lb	12,000,000 gals	3.785 l			1.10	**= 2,200 lbs Liquid Bleach (CT App)**
20 ppm active	l	454,000 mg		gal				

1. The Cooling Tower applications of BD1500 and Towerbrom 60m were performed assuming a maximum volume to be treated in the basin.
2. Bentonite clay is fed at 5x product dose (or 10x active dose) for quats. It is applied at the inlet to the SCCW and Cooling Tower Blow Down (CTBD) weirs. Max ppm feed dose of 10 ppm is based on the worst case scenario of 3 ppm active Spectrus CT1300 or Spectrus NX 1104 max feed dose, with a maximum IPS flow rate of 30,000 gpm, and with minimum dilution from a combined SCCW and CTBD discharge flow rate of 90,000 gpm.

Raw Water Treatment Programs

The fundamental approach and active ingredients for the various treatment programs at WBN have not changed significantly in more than 13 years. Products with slightly different formulations of the same active ingredients or constituents of concern and the processes or frequencies of applying those products have changed periodically.

1. Dispersants used year round to facilitate passivation of carbon steel piping and surfactants used briefly during oxidizing biocide treatments have functioned a bit differently over the years with some differences in active ingredients, but all have been of low toxicity.
2. Passivation (protection from corrosion) of carbon steel piping continues to be pursued with solutions containing zinc and phosphorous. These solutions have a greater tendency for toxicity than dispersants and surfactants, but have been managed and discharged at concentrations below any treatment standards or potential toxicity concerns.
3. Passivation of copper piping occurs on a very small scale and results in only occasional releases of very small quantities primarily due to maintenance activities. Tolytriazole is only considered slightly toxic and discharge limits do not approach any levels of concern.
4. Treatment with *oxidizing* biocides has had prior approval. Based on annual biological assessments and periodic toxicity testing, permit limitations of 0.10 ppm have been sufficient to ensure both chronic and acute toxicity concerns are being addressed for oxidizing biocides.
5. Treatment with *non-oxidizing* biocides use quaternary amine compounds with similar toxicities for mollusk control. While this is perhaps the most toxic chemical treatment program used, detailed calculations are performed for each treatment to ensure discharge limitations are observed. In addition, WBN has performed biomonitoring at OSN 101 and OSN 113 twice per year since this product use was initiated August 2004. Short-term chronic testing of OSN 101 and OSN 113 samples have shown no toxicity to fathead minnows or daphnids for all biomonitoring tests. Detoxifing the quaternary amine compounds with bentonite clay will be performed when required.

NOTE: Oxidizing biocide treatments do not occur at the same time as non-oxidizing biocide treatments.

6. **The most significant change in this proposal** is WBN's proposal to change suppliers of our water treatment products. The new suppliers products are "similar" products containing "essentially the same chemical" as products previousely approved by the Division. The processes and frequencies of applying the products will not change. In addition, the discharge concentrations of the replacement chemicals will remain the same as the currently approved chemicals to ensure the same high level of protection for aquatic life in the Tennessee River while increasing the flexibility of plant equipment options..

Treatment Plan Overview and Toxicity Summaries	
Document	**Summary**
Plan Overview.doc	An overview of the proposed raw water treatment programs at WBN.
Toxicity Summary.doc	Bench top toxicity studies on individual products and the synergistic effects of the various treatment programs have been conducted on three occasions for TVA nuclear facilities. The simulated effluents tested included both molluscicides contained in this treatment plan. Results from these studies are incorporated into the attached summary of toxicity endpoints compared with projected instream product concentrations. Reports are available upon request. Ongoing documentation for protection against synergistic and/or chronic impacts by WBN's treatment programs is provided by routine 7 day toxicity testing at OSN 101 (diffuser discharge) and OSN 113 (supplementary condenser cooling water discharge). WBN has never failed a toxicity test at either outfall.

AN OVERVIEW OF WATER CHEMICAL ADDITIVES

Inspection and chemical treatment programs have been implemented at TVA Watts Bar Nuclear Plant to control fouling, plugging, and pipe wall thinning of the raw water systems. Most of the chemicals used in these treatment programs are added at the Intake Pumping Station (IPS) to ensure all raw water systems are protected. Several of these systems, the High Pressure Fire Protection and the Essential Raw Cooling Water (ERCW) systems in particular, are essential for the safe operation of the plant. To ensure protection of the receiving stream, water treatment processes are controlled to comply with State Water Quality criteria and applicable NPDES permit conditions. WBN proposes to show compliance with the treatment plans below using mass balance calculations where possible.

CORROSION INHIBITION of CARBON STEEL PIPING and IRON PIPING

WBN currently uses one chemical to provide corrosion protection for carbon steel piping in the plant, a zinc/orthophosphate product known as MSW-109, which contains 12.6% zinc chloride and 36% orthophosphate. It will continue to be necessary to apply the aforementioned product when the river temperature is equal to or greater than 60 degrees Fahrenheit. The concentration of zinc and phosphorous in the plant effluents will not exceed 0.2 ppm and no changes are being proposed for this treatment program.

To facilitate iron corrosion inhibition, WBN proposes to replace the dispersant PCL-401 with 73200, a non-toxic 36% high stress polymer. The dispersant will be fed year-round if required.

RAW COOLING WATER BIOCIDE TREATMENTS

Protection of the raw cooling water pipe systems requires oxidizing biocide (chlorination) and non-oxidizing biocide treatments to control macro invertebrates and microbiologically induced corrosion (MIC). The following raw water chemical additions were evaluated for optimal effectiveness and compliance with the NPDES permit.

OXIDIZING BIOCIDE TREATMENT

WBN proposes to maintain continuous treatment in plant systems for mollusk control and microbiological activity with H-901G, a product previously approved by the Division of Water Pollution Control. As an alternative to H-901G, WBN is requesting approval to use liquid bleach for continuous routine oxidizing biocide treatment of the raw water system, including the ERCW and Condenser Circulating Water (CCW). Continuous oxidation is necessary to ensure plant safety as TVA has recently observed year-round veliger (mussel larvae) infestations. Utilization of liquid bleach as a component of the oxidizing biocide plan represents potential improvements in treatment effectiveness in addition to cost effectiveness. No increase in chlorine discharge limits is requested in this plan.

Due to the potential need to attain higher in-plant target values for chlorine, WBN proposes to continue to de-chlorinate prior to discharging as needed using sodium bisulfite (Nalco 7408) solutions to ensure the current discharge limit of 0.1-ppm chlorine is not exceeded. Sodium bisulfite will be ratio-fed at a rate of approximately 4 ppm product for every 1.0 ppm of chlorine. The de-chlorination process will be controlled to ensure that the discharge concentration of chlorine will not exceed 0.1 ppm.

AN OVERVIEW OF WATER CHEMICAL ADDITIVES
(continued)

Oxidizing biocides are generally more effective when used in conjunction with a bio-penetrant or surfactant; therefore, WBN proposes to continue to utilize the option to use Biodetergent 73551 as a surfactant to facilitate oxidizing biocide applications. Surfactant addition will be controlled such that the discharge concentration of Biodetergent 73551 will not exceed 2.0 ppm.

NON OXIDIZING BIOCIDE TREATMENT (MOLLUSK CONTROL)

WBN proposes to continue to use non-oxidizing biocides H150M or Spectrus NX1104. WBN requests addition of the non-oxidizing biocide H150M to the Biocide Corrosion Treatment Plan (B/CTP) approval. H-130M was previously authorized for use in the B/CTP and a courtesy notification was made on April 22, 2005, stating that H-130M would be replaced with Nalco H150M. These are "similar" products containing "essentially the same chemical" as both products contain only quaternary ammonium compounds (quats) as the active ingredients with almost identical toxicities.) When river temperatures are greater than or equal to 60 degrees Fahrenheit, WBN will terminate oxidizing biocide treatment and perform a periodic (minimum of 4 times per train per year) non-oxidizing biocide treatment of the raw water systems. WBN proposes to treat up to the allowable instream concentrations for the active ingredients in these products. For short-term (4-6 hour), low concentration applications for cross-tie treatments, WBN will show by calculation that the required concentrations are being met and document the minimum flow in the river during the treatment period.

WBN will need to target concentrations in the plant for routine A & B Train treatments (48-72 hours) that have the potential to exceed allowable instream concentrations. During these treatments, WBN proposes to continue to detoxify the effluent as needed by treatment with bentonite clay to ensure NPDES discharge limitations are met. The effectiveness of detoxification will be confirmed with twice daily sampling for the active ingredient in the effluent during the treatment period.

COOLING TOWER TREATMENT PLAN

WBN currently adds the oxidizing biocide Towerbrom 960 to the cooling tower basin on a periodic basis for biological control. Towerbrom 960, composed of 89% Sodium Dichloroisocyanurate and 7% Sodium Bromide, dissolves to release bromine and chlorine. As previously approved, Towerbrom 960 will be added until a minimum residual of 0.5 ppm chlorine is achieved in the cooling tower basin. This treatment will be performed with the diffusers and the Supplemental Condenser Cooling Water (SCCW) system isolated or, at WBN's discretion WBN will de-chlorinate as needed using sodium bisulfite solutions to ensure the current discharge limit of 0.1 ppm chlorine is not exceeded. Sodium bisulfite (Nalco 7408) will be ratio-fed at a rate of 4 ppm product for every 1.0 ppm of chlorine. WBN proposes to continue to utilize the option to add Biodetergent 73551 to enhance Towerbrom effectiveness. The process will be controlled to ensure that the discharge concentration of chlorine to the Tennessee River will not exceed 0.1 ppm and the discharge concentration of Biodetergent 73551 will not exceed 2.0 ppm.

AN OVERVIEW OF WATER CHEMICAL ADDITIVES
(continued)

In order to maintain the operating efficiency of the Training Center Cooling Tower, WBN currently continuously adds SWS 4550, a non-corrosive, inorganic phosphate-free corrosion and scale inhibitor. SWS 4550 is composed of Phosphino-carboxylic acid copolymer; Sodium chloride; Diethylenetriaminepenta-methylene phosphonic acid, Ethylenediamine tetracetic acid, Sodium salt; and Sodium Hydroxide. In TVA toxicity tests, the lowest concentration that exhibited no toxicity was equal to the maximum concentration expected in the blowdown (50 ppm/v). In other words, the cooling tower wastestream is not be toxic (due to SWS 4550) even as it comes out of the cooling tower into the YHP. As the Training Center cooling tower blowdown, a maximum of 1,000 gallons per day, was previously approved for disposal via the Construction Runoff Holding Pond, WBN has re-routed cooling tower blowdown from the Training Center to the yard holding pond that discharges via NPDES permitted OSN 101. The addition of this effluent will have an insignificant impact on OSN 101 flows (<0.1%).

Product Toxicity Data Summary and Comparison with Maximum Instream Wastewater Concentrations (IWC)

Chemical	Organism[1]	Acute Endpoints (ppm as active) 48-h LC_{50}	Acute Endpoints (ppm as active) 96-h LC_{50}	Chronic Endpoints (ppm as active) NOEC	Chronic Endpoints (ppm as active) IC_{25}	Maximum Discharge Concentration (<acute endpoints?) (ppm as active)	101 Instream Waste Concentration (IWC = 2.37%) (< chronic endpoints?) (ppm as active)	113 Instream Waste Concentration (IWC = 7.58%) (< chronic endpoints?) (ppm as active)
Flogard MS6209	EPA database	Zn CMC = 0.120		Zn CCC = 0.120		0.2[2]	0.005	0.015
	C. dubia				1.22			
	P. promelas				3.2			
Depositrol PY5200	C. dubia				161	0.2	0.005	0.015
	P. promelas				600			
Inhibitor AZ8100	C. dubia				10	0.25	0.006	0.019
	P. promelas				28			
	Rainbow Trout							
Spectrus BD1500	D. magna					2.0	0.047	0.152
	C. dubia				98			
	P. promelas				450			
	Bluegill							
	Rainbow Trout							
Towerbrom 60m	D. magna	2.43	-	-	-	0.10	0.002	0.008
	P. promelas	0.679	-	-	-			
	Bluegill	-	0.417	-	-			
	Rainbow Trout		0.359					
Spectrus OX1200	D. magna	0.45				0.10	0.002	0.008
	P. promelas		2.25					
	Bluegill							
	Rainbow Trout							
Spectrus DT1404	D. magna	NOEC = 760				10	0.24	0.76

Product Toxicity Data Summary and Comparison with Maximum Instream Wastewater Concentrations (IWC), continued

Chemical	Organism[1]	Acute Endpoints (ppm as active)		Chronic Endpoints (ppm as active)		Maximum Discharge Concentration (<acute endpoints?)	101 Instream Waste Concentration (< chronic endpoints?)	113 Instream Waste Concentration (< chronic endpoints?)
		48-h LC50	96-h LC50	NOEC	IC_{25}	(ppm as active)	(ppm as active)	(ppm as active)
Spectrus CT1300	C. dubia	0.18			0.049	<0.05 measured in effluent	<0.001 active ingredient in stream after mixing	<0.004 active ingredient in stream after mixing
	P. promelas		0.21		0.130			
Spectrus NX1104	D. magna	0.021/ .013- NOEC	-	-	-	<0.031 quaternary ammonium compound measured in effluent	<0.001 total active ingredients in stream after mixing	<0.002 total active ingredients in stream after mixing
	C. dubia	0.074	0.009	-	0.004			
	P. promelas	-	0.377/ 0.13- NOEC	-	-			
	P. promelas	0.420	0.087	-	0.048			
	U. imbecillis	-	-	-	9-day LC_{50} w/o silt=0.018; w/silt =0.139			
	B. calyciflorus	0.234 (24-h)	-	-	-			
Bentonite Clay	None				-	10	Product believed non-toxic	Product believed non-toxic
Liquid Bleach[3]	D. magna	0.032	-	-	-	0.10 Chlorine (Total Residual)	-	-
	C. dubia	0.005 (24h)	-	-	-			
	P. promelas		0.080	-	-			

Product Toxicity Data Summary and Comparison with Maximum Instream Wastewater Concentrations (IWC)
(continued)

Notes:

1. Data Source: Manufacturer or TVA.
2. When SCCW is in service and there is zero river flow, a dilution factor of 4 is applicable to discharge concentrations (i.e. instream concentration is $\leq$ 0.05). When SCCW is out of service there is a minimum flow interlock with Watts Bar Dam that ensures a minimum flow of 3500cfs exists in the river. Either situation is protective.
3. Based on annual biological assessments and periodic toxicity testing, permit limitations of 0.10 total residual chlorine have been sufficient to ensure that chronic and acute toxicity concerns are being addressed for oxidizing biocides. It is widely accepted that WET methods are not reliable for assessing toxicity elicited by chlorine since residual chlorine degrades rapidly during sample holding periods and under ambient laboratory testing conditions. The toxicity values presented here were derived from tests that measured chlorine toxicity in freshly-prepared solutions in the laboratory and are therefore overly-conservative.

Flogard MS6209 (Zinc Chloride and Phosphoric Acid mixture)

MS6209 contains carbon piping corrosion inhibitors. Since there is no specific toxicity data for this product, TVA toxicity data for zinc have been evaluated as part of this plan. Steam electric guidelines indicate a 1.0 ppm limit for zinc in cooling tower blow down effluents and the EPA freshwater WQC for zinc is 0.120 ppm. While the EPA freshwater WQC has not identified a limitation for phosphorous, a 1.0 ppm limit for phosphorous has been identified for potential phosphorous bearing cleaning solutions at OSN-107. The primary source of phosphorous in the TN river is likely due to runoff from livestock operations and the application of fertilizers. Therefore, it is proposed that WBN continue to limit zinc and phosphorous from chemical treatment programs to 0.2 ppm at the diffuser discharge sample point.

River flow rates and SCCW operation have a potential to impact the in stream concentration for the continuous application of these active ingredients. MS6209 feed rates are based on flow from the IPS and are not adjusted for SCCW flow conditions. When the SCCW is in operation, the amount of this product discharged through cooling tower blowdown (CTBD) is reduced by a factor of 4 (based on average daily discharges reported on the form 2C in the NPDES permit application). If there is zero flow in the river, the diffuser is isolated, but not the gravity fed SCCW system. Based on the maximum discharge concentration of 0.2 ppm and the dilution factor of 4, the actual discharge concentration in the SCCW effluent is 0.05 ppm and is still protective of the 0.120 ppm WQC. If the SCCW is out of service for several days, zinc concentrations will approach 0.2 ppm in the cooling tower blowdown. However, CTBD is not discharged through the WBN diffusers to the Tennessee River unless there is 3500 cfs river flow. Therefore, the in-stream WQC is still protected.

Document	Summary
 "Flogard MS6209 MSDS.pdf"	Material Safety Data Sheet.
 "Flogard MS6209 Fact Sheet.pdf"	Product Bulletin

Depositrol PY5200 (Copolymer dispersant)

Depositrol PY5200 is a dispersant commonly used in water treatment programs to minimize fouling and under-deposit corrosion in the ERCW and Raw Cooling Water (RCW) systems. This product makes carbon piping corrosion inhibitors more effective (facilitate iron corrosion inhibition). This chemical is considered non-toxic according to the MSDS and toxicity studies. WBN proposes to feed PY5200 year round while ensuring that the concentration of the chemical will not exceed 0.2 mg/L in the effluent. The dispersant will be fed year-round if required.

Document	Summary
 "Depositrol PY5200 MSDS.pdf"	Material Safety Data Sheet.
 "Depositrol PY5200 Fact Sheet.pdf"	Product Bulletin

Inhibitor AZ8100 (Sodium Tolytriazole)	
Inhibitor AZ8100 is a corrosion inhibitor used to inhibit copper piping corrosion. This chemical is typically applied to closed loop cooling systems. WBN proposes to feed tolytriazole on a periodic basis to small portions of the ERCW and RCW systems. This will result in a discharge concentration of less than 0.25 ppm as tolytriazole in plant effluents. The toxicity data provided in the MSDS and the bench top studies conducted by TVA indicate that a discharge concentration of <0.25 ppm is extremely unlikely to produce any impact on aquatic life in the TN river.	
Document	**Summary**
 "Inhibitor AZ8100 MSDS.pdf"	Material Safety Data Sheet.
 "Inhibitor AZ8100 Fact Sheet.pdf"	Product Bulletin

Spectrus BD1500 (Nonionic Surfactant)	
Spectrus BD1500 is a non-ionic surfactant commonly used in water treatment programs to remove and disperse "soft foulant" (biofilm-enmeshed mud, silt and clay) deposits in cooling water systems. For routine chlorination treatments, this product is added for approximately 30 minutes prior to initiating treatment to enhance the effectiveness of oxidizing biocides/chlorination. This product is also fed for at least 15 minutes prior to Towerbrom treatments of the Unit 1 cooling tower basin. This product has a low toxicity and plant effluent will not exceed 2.0 mg/L of active ingredients.	
Document	**Summary**
 "Spectrus BD1500 MSDS.pdf"	Material Safety Data Sheet.
 "Spectrus BD1500 Fact Sheet.pdf"	Product Bulletin

Towerbrom 60m (Sodium Bromide & Sodium Dichloroisocyanurate)	
Towerbrom 60m is an oxidizing biocide, generating bromine and chlorine solutions when dissolved in water, used to control slime producing organisms. Towerbrom 60m is used to treat the Unit 1 cooling tower basin. When applied without isolating the SCCW or Diffuser discharge points, effluent(s) will be dechlorinated with sodium bisulfite (Spectrus DT1404) to assure that the TRO in the effluent does not exceed 0.1 mg/L. Confirmatory samples will be collected during each day of treatment and analyzed according to NPDES permit requirements to ensure discharge limitations are met. Furthermore, dechlorination will be used should in-plant targets threaten discharge limitations for chlorine.	
Document	**Summary**
 "Towerbrom 60m granules MSDS.pdf"	Material Safety Data Sheet.
 "TB_60M Spec sheet.pdf"	Product Bulletin

Spectrus OX1200 (1-Bromo-3-Chloro-5-Dimethyl-Hydantoin)	
Spectrus OX1200 is an oxidizing organic biocide that puts 57% of its active ingredient into solution as bromine and chlorine. WBN may utilize Spectrus OX1200 for the routine continuous treatment of the plant's ERCW and RCW piping. Effluents will be dechlorinated should in-plant targets threaten discharge limitations for chlorine. When dechlorinating, confirmatory samples will be collected during each day of treatment and analyzed according to NPDES permit requirements to ensure discharge limitations are met. Chlorine is monitored 5 days per week at OSN 101 and OSN 113 in accordance with NPDES permit requirements to ensure discharge limitations are met.	
Document	**Summary**
 "Spectrus OX1200 MSDS.pdf"	Material Safety Data Sheet.
 "Spectrus OX1200 Fact Sheet.pdf"	Product Bulletin

Spectrus DT1404 (Sodium Bisulfite)

Sodium Bisulfite is an industry standard for de-chlorinating effluents in addition to its widespread use as a flocculant and as a detoxifying agent for organics. This product has the potential to deoxygenate systems. However, effluent deoxygenation will not occur when the product is used according to the WBN proposed feed rates as sodium bisulfite reacts preferentially with halogens (chlorine and bromine) before it reacts with oxygen. While WBN will add sodium bisulfite to de-chlorinate effluents, significant oxygen depletion should not occur as any oxygen depleted is virtually immeasurable and the discharge quickly resaturates with oxygen from air contact. To assure that over feeding is not occurring, WBN will measure dissolved oxygen levels in the system and the effluent when this chemical is being used.

Document	Summary
 "Spectrus DT1404 MSDS.pdf"	Material Safety Data Sheet.
 "Spectrus DT1404 Fact Sheet.pdf"	Product Bulletin

Spectrus CT1300 (Alkyl Dimethyl Benzyl Ammonium Chloride)

SPECTRUS CT1300 is a non-oxidizing biocide which contains a quaternary ammonium compound (quat). as the active ingredients for mollusk control. H-130M, also a quat, was previously approved for use by the Division. SPECTRUS CT1300, and the previously approved quat products (H130M and H150M) are "similar" products containing "essentially the same chemical". SPECTRUS CT1300 toxicity tests indicate that the acute toxicity is almost identical to the currently used quat product. The same discharge limitations of 0.05 ppm should be protective of aquatic life.

Actual active ingredient discharges are based on calculations that assume no demand in the system, thereby increasing the safety margin for instream protection. In addition, the requested discharge criteria for this product was determined by application of a safety factor of 10 to the mussel toxicity test endpoint.

When WBN needs to attain in plant target concentrations for the active ingredient in this product that will ensure protection of safety related equipment but threaten in stream criteria, WBN will ensure water quality is protected by adding bentonite clay to OSN 101 and OSN 113 to detoxify the active ingredient. TVA's own studies as well as those of the manufacturer of this product indicate that bentonite clay will be very effective at detoxifying this product. The effectiveness of detoxification will be confirmed with twice daily sampling for the active ingredient in the effluent during the treatment period.
In addition, the use of SPECTRUS CT1300 shall be limited to periods of time when the Tennessee River flow is 2,262 MGD or greater.

Document	Summary
 "Spectrus CT1300 MSDS.pdf"	Material Safety Data Sheet.
 "Spectrus CT1300 Fact Sheet.pdf"	Product Label

Spectrus NX1104 (Dimethylbenzylammonium chloride and Dodecylguanidine Hydrochloride)	
Spectrus NX1104 is a non-oxidizing biocide which contains quaternary ammonium compounds (quats) as the active ingredients for mollusk control. This product was approved by the Division with the condition that the concentration of active ingredients not exceed 0.031 mg/L in the plant effluents at OSN 101 and OSN 113. To ensure adherence to NPDES permit limits, WBN will show by calculation that the required concentrations are being met for each application and document the minimum flow in the river during the treatment period. Should WBN need to target concentrations in the plant that have the potential to threaten water quality, WBN will detoxify the effluent as needed by treatment with bentonite clay to ensure discharge limitations are met. The effectiveness of detoxification will be confirmed with twice daily sampling for the active ingredient in the effluent during the treatment period.	
Document	**Summary**
 "SPECTRUSNX1104 MSDS.pdf"	Material Safety Data Sheet.

Bentonite Clay (Sodium Silicate)	
Bentonite clay is the industry standard for detoxifying effluents by absorbing and binding the toxic constituents in SPECTRUS CT1300. TVA and manufacturer studies indicate that bentonite clay is very effective at removing the constituents of concern for both of the non-oxidizing biocides proposed in this treatment plan. The primary end product following absorption of the constituents is carbon dioxide from degradation of the complex organic molecules. No toxicity data is available for this product. Treatment of OSN 101 and OSN 113 with sodium bentonite shall be undertaken any time calculations indicate an exceedance of the effluent concentration limits for SPECTRUS CT1300 or Spectrus NX1104 will occur. Compliance with TSS limitations will be met during use of this product.	
Document	**Summary**
 "MSDS Bentonite Clay.pdf"	Material Safety Data Sheet.

Liquid Bleach (Sodium Hypochlorite)	
The bleach solution is 12.5% active NaOCl producing 10.2% available chlorine. WBN proposes to utilize Sodium Hypochlorite for the routine continuous treatment of the plant's ERCW and RCW piping. Effluents will be dechlorinated should in-plant targets threaten discharge limitations for chlorine. When dechlorinating, confirmatory samples will be collected during each day of treatment and analyzed according to NPDES permit requirements to ensure discharge limitations are met. Chlorine is monitored 5 days per week at OSN 101 and OSN 113 in accordance with NPDES permit requirements to ensure discharge limitations are met.	
Document	**Summary**
 SODIUM HYPOCHLORITE MSD	Material Safety Data Sheet.
 NaOCl Product Bulletin.pdf	Product Bulletin

GE
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 05-FEB-2009
Supercedes: 29-JAN-2009

FLOGARD MS6209

1 Identification

Identification of substance or preparation
FLOGARD MS6209

Product Application Area
Water-based corrosion inhibitor.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 05-FEB-2009

2 Hazard(s) identification

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EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin/steel
Odor: Slight; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical/CO2/foam or water--slippery condition; use sand/grit.

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POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes severe irritation, burns or tissue ulceration with subsequent scarring.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range(w/w%)
13598-37-3	PHOSPHORIC ACID, ZINC SALT (2:1) Irritant	40-70
7664-38-2	PHOSPHORIC ACID Corrosive	15-40

4 First-aid measures

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. *Do not induce vomiting. Immediately contact physician.* Rinse mouth with plenty of water. Dilute contents of stomach using 4-10 fluid ounces (120-300 mL) of milk or water.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical/CO2/foam or water--slippery condition; use sand/grit.
HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of phosphorus
FLASH POINT:
> 200F > 93C P-M(CC)
MISCELLANEOUS:
Corrosive to skin/steel
UN 1805;Emergency Response Guide #154

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:
Acidic. Corrosive(Skin/eyes). Do not mix with alkaline material.
STORAGE:
Keep containers closed when not in use. Preferably stored between 40-100F (5-38C).

8 Exposure controls / personal protection

EXPOSURE LIMITS

CHEMICAL NAME

PHOSPHORIC ACID, ZINC SALT (2:1)
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

PHOSPHORIC ACID
PEL (OSHA): 1 MG/M3
TLV (ACGIH): 1 MG/M3

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR

1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:
gauntlet-type rubber, butyl or neoprene gloves, chemical resistant apron -- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 Physical and chemical properties

Specific Grav.(70F,21C)	1.711	Vapor Pressure (mmHG)	~ 15.0
Freeze Point (F)	< -30	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	70	% Solubility (water)	100.0

Odor		Slight
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		< 1.0
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:
Contact with strong bases may cause a violent reaction releasing heat.

INCOMPATIBILITIES:
May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:
oxides of phosphorus

11 Toxicological information

Oral LD50 RAT:	>2,500 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	
Inhalation LC50 RAT:	>20 mg/L/hr
NOTE - Estimated value	
Skin Irritation Score RABBIT:	CORROSIVE
NOTE - EPA Category I	
Eye Irritation Score RABBIT:	CORROSIVE
NOTE - Estimated value	

12 Ecological information

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= 1.5; No Effect Level= .63 mg/L
Ceriodaphnia 7 Day Static Renewal Bioassay
IC25 = 1.9 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 12; No Effect Level= 1.5 mg/L
Fathead Minnow 7 Day Static Renewal Bioassay
IC25 = 5 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 14; No Effect Level= 2.5 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
LC50= 4.9; No Effect Level= 1.6 mg/L

BIODEGRADATION

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive (pH,steel); D006=Cadmium; D008=Lead.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD:	Corrosive to skin/steel
PROPER SHIPPING NAME:	PHOSPHORIC ACID SOLUTION 8, UN 1805, PG III, RQ

DOT EMERGENCY RESPONSE GUIDE #: 154
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:
All components of this product are included on or are in compliance with the U.S. TSCA regulations.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
1,962 gallons due to PHOSPHORIC ACID;

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: 140901

Category Code(s):

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

CAS#	CHEMICAL NAME	RANGE
13598-37-3	PHOSPHORIC ACID, ZINC SALT (2:1)	41.0-50.0%

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		**CODE TRANSLATION**
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	05-JAN-1999	10	29-JAN-1997
	25-JUN-1999	11	05-JAN-1999
	23-AUG-1999	12	25-JUN-1999
	13-JUL-2000	15	23-AUG-1999
	03-JAN-2001	15	13-JUL-2000
	01-MAY-2001	12	03-JAN-2001
	01-MAY-2007	4,5,8,10,15	01-MAY-2001
	29-JAN-2008	4,8,13	01-MAY-2007
	29-JAN-2009	3,4,8,10,15	29-JAN-2008
	05-FEB-2009	12	29-JAN-2009

GE Infrastructure
Water & Process Technologies

Fact Sheet

FloGard* MS6209

Inhibitor Corrosion and Deposit Control Agent

- Mild steel corrosion inhibitor

Description and Use

FloGard MS6209 is a liquid phosphate/zinc product for inhibiting corrosion in once-through and recirculating cooling and auxiliary water systems.

Once-through Systems: At typical use levels, the phosphate in FloGard MS6209 combines with calcium and/or zinc to form a barrier film at the cathodic site of the corrosion cell. This is the primary mode of the corrosion protection.

Treatment and Feeding Requirement

Dosage: Proper treatment levels for FloGard MS6209 depend on many factors, such as the calcium concentration, pH of the circulating water and conditions particular to a given installation. The typical dosage range is 3 to 15 ppm for once-through systems and for specific application.

Dilution: FloGard MS6209 may be fed directly from the shipping container or diluted to any convenient strength. For best results, this product should be fed continuously.

Feed Equipment: Tanks, pumps piping and valves may be made of mild steel or most common plastics.

Monitoring: A photometric procedure can be used to monitor the phosphate level in the treated water.

General Properties

Physical properties of FloGard MS6209 are shown on the Material Safety Data Sheet, a copy of which is available upon request.

Packaging Information

FloGard MS6209 is a liquid blend available in a variety of containers and delivery methods. Contact your GE representative for details.

Storage

Protect from freezing. If this product is frozen during shipment or storage, slight mixing may be required to ensure homogeneity.

Safety Precautions

A Material Safety Data Sheet containing detailed information about this product is available upon request.

Visit us online at www.gewater.com

Global Headquarters
Trevose, PA
215-355-3300

North America
Minnetonka, MN
952-933-2277

Europe/Middle East/Africa
Heverlee, Belgium
32-16-40-20-00

Asia/Pacific
Shanghai, China
86-21-5298-4573

CPFC73EN 0410

GE
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 05-FEB-2009
Supercedes: 02-OCT-2008

DEPOSITROL PY5200

1 Identification

Identification of substance or preparation
DEPOSITROL PY5200

Product Application Area
Water-based deposit control agent.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 05-FEB-2009

2 Hazard(s) identification

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EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause slight irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Odor: Slight; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: *dry chemical, carbon dioxide, foam or water*

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POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause slight irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

4 First-aid measures

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of carbon and sulfur
FLASH POINT:
> 210F > 99C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:
Normal chemical handling.
STORAGE:
Keep containers closed when not in use. Protect from freezing. If frozen, thaw and mix completely prior to use. Shelf life 360 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.
SKIN PROTECTION:
rubber, butyl, viton or neoprene gloves -- Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles

9 Physical and chemical properties

Specific Grav.(70F,21C)	1.169	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	25	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-4		
Viscosity(cps 70F,21C)	42	% Solubility (water)	100.0

Odor		Slight
Appearance		Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 210F > 98C
pH As Is (approx.)		5.2
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.
POSSIBILITY OF HAZARDOUS REACTIONS:

INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
oxides of carbon and sulfur

11 Toxicological information

Oral LD50 RAT:	>5,000 mg/kg
Dermal LD50 RABBIT:	>2,000 mg/kg
Inhalation LC50 RAT:	>5 mg/L/4hr
Skin Irritation Score RABBIT:	1
Eye Irritation Score RABBIT:	1.67

12 Ecological information

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= 1265 mg/L
Ceriodaphnia 7 Day Static Renewal Bioassay
IC25 = 538 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 1767; No Effect Level= 1250 mg/L
Fathead Minnow 7 Day Static Renewal Bioassay
LC50 Greater Than= 2000; IC25 = 2000 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 1960; No Effect Level= 313 mg/L
Mysid Shrimp 48 Hour Static Renewal Bioassay (pH adjusted)
10% Mortality= 16000; 0% Mortality= 8000 mg/L
Sheepshead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
0% Mortality= 16000 mg/L

BIODEGRADATION

BOD-28 (mg/g): 32
BOD-5 (mg/g): 10
COD (mg/g): 368
TOC (mg/g): 144

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD: Not Applicable
PROPER SHIPPING NAME:

DOT EMERGENCY RESPONSE GUIDE #: Not applicable
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:
All components of this product are included on or are in compliance with the U.S. TSCA regulations.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
FOOD AND DRUG ADMINISTRATION:
FDA APPROVED FOR MILL SUPPLY WATER
NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: Not Registered
This product contains ingredients that have been determined as safe for use in boilers, steamlines and cooling systems where there is no food contact. (G7)
SARA SECTION 312 HAZARD CLASS:
Product is non-hazardous under Section 311/312
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	29-JAN-1997		** NEW **
	10-SEP-1997	3,8,10,11,16;EDIT:4	29-JAN-1997
	06-FEB-1998	12	10-SEP-1997
	18-JAN-2001	15	06-FEB-1998
	31-AUG-2001	15	18-JAN-2001
	30-OCT-2001	4	31-AUG-2001
	17-APR-2006	7,8	30-OCT-2001
	02-OCT-2008	4,5,8,10	17-APR-2006
	05-FEB-2009	12	02-OCT-2008

DepositTrol™ PY5200

Cooling Water Polymeric Dispersant

- Patented calcium phosphate scale inhibitor
- Advanced polymer technology
- Permits proper phosphate concentration for corrosion inhibition of mild steel
- Provides excellent dispersion of suspended solids

Description and Use

DepositTrol™ PY5200 is a unique deposit control agent for use in cooling water systems. It incorporates a polymeric agent, GE Infrastructure Water & Process Technologies HPS I, a third generation cooling water polymer.

Typical Applications

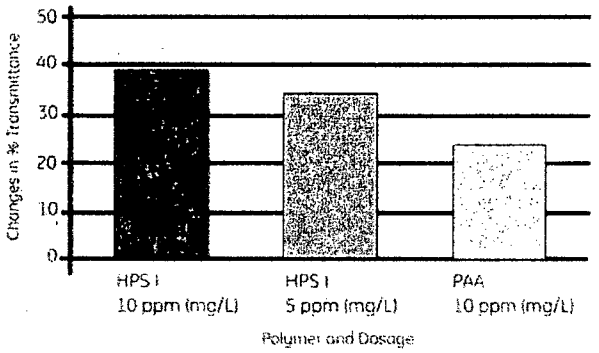

Figure 1: Clay Dispersion

DepositTrol PY5200 controls calcium phosphate formation and general deposition such as silt (see Figure 1), iron, and suspended solids. It is particularly effective in the presence of certain contaminants, such as results from cationic carryover from clarifiers, or in the case where boiler blowdown is added to the cooling system for discharge or water conservation purposes.

DepositTrol PY5200 is designed to be applied as one component of a Dianodic Plus™ program. With DepositTrol PY5200, phosphate concentrations in a Dianodic Plus treatment can be maintained at a high enough level to promote the formation of a passivating film on mild steel, thereby attaining the desired corrosion protection.

Treatment and Feeding Requirement

Dosage - The proper treatment levels of DepositTrol PY5200 depend on the specific needs of your system. The product should be fed in accordance with control procedures that GE establishes for a particular application. For consistent protection, continuous feed is recommended.

Feed point - DepositTrol PY5200 should be fed to a point in the system where it will be rapidly mixed with the bulk cooling water.

Dilution - DepositTrol PY5200 can be diluted with good quality water to convenient feeding strengths.

Feed Equipment - Tanks, pumps, piping, and valves should be made of stainless steel, polyethylene, polypropylene, PVC, Hypalon, or Teflon. Mild steel should not be used.

Physical Properties

Physical properties of DepositTrol PY5200 are shown on the Material Safety Data Sheet, a copy of which is available on request.

Packaging Information

DepositTrol PY5200 is a liquid blend available in a wide variety of customized containers and delivery methods. Contact your GE representative for details.

Safety Precautions

A Material Safety Data Sheet containing detailed information about this product is available upon request.

Visit us online at www.gewater.com

Global Headquarters
Trevose, PA
215-355-3300

North America
Minnetonka, MN
952-933-2277

Europe/Middle East/Africa
Heverlee, Belgium
32-16-40-20-00

Asia/Pacific
Shanghai, China
86-21-5298-4573

GE
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 05-FEB-2009
Supercedes: 03-MAY-2000

INHIBITOR AZ8100

1 Identification

Identification of substance or preparation
INHIBITOR AZ8100

Product Application Area
Water-based corrosion inhibitor.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 05-FEB-2009

2 Hazard(s) identification

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin
Odor: Mild; Appearance: Yellow To Brown, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

May cause severe irritation or burning of the gastrointestinal tract.

TARGET ORGANS:
Prolonged or repeated exposures may cause tissue necrosis.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Causes redness or itching of skin, possibly leading to burns (dependent on the length of exposure).

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range(w/w%)
64665-57-2	BENZOTRIAZOLE,METHYL,SODIUM SALT (SODIUM TOLYLTRIAZOLE),(TTA) Corrosive (eyes and skin); toxic (by ingestion)	40-70

4 First-aid measures

SKIN CONTACT:
Remove clothing. Wash area with large amounts of soap solution or water for 15 min. Immediately contact physician.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
Remove to fresh air. Apply necessary first aid treatment. Immediately contact a physician.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

elemental oxides

FLASH POINT:

> 200F > 93C SETA(CC)

MISCELLANEOUS:

Corrosive to skin

UN 1719;Emergency Response Guide #154

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Alkaline. Corrosive(Skin/eyes). Do not mix with acidic material.

STORAGE:

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

8 Exposure controls / personal protection

EXPOSURE LIMITS

CHEMICAL NAME

BENZOTRIAZOLE,METHYL,SODIUM SALT (SODIUM TOLYLTRIAZOLE),(TTA)

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:

adequate ventilation

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

gauntlet-type neoprene gloves, chemical resistant apron--
Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9 Physical and chemical properties

Specific Grav.(70F,21C)	1.215	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	-25	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-32		
Viscosity(cps 70F,21C)	190	% Solubility (water)	100.0

Odor		Mild
Appearance		Yellow To Brown
Physical State		Liquid
Flash Point	SETA(CC)	> 200F > 93C
pH 10% Sol. (approx.)		~ 11.7
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.
POSSIBILITY OF HAZARDOUS REACTIONS:

INCOMPATIBILITIES:
May react with acids.
DECOMPOSITION PRODUCTS:
elemental oxides

11 Toxicological information

Oral LD50 RAT:	1,150 mg/kg
Dermal LD50 RABBIT:	>2,000 mg/kg

NOTE - Estimated value

12 Ecological information

AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay
LC50= 109.3; No Effect Level= 42 mg/L
Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= 147; No Effect Level= 37 mg/L
Ceriodaphnia 7 Day Static Renewal Bioassay
IC25 = 20 mg/L
Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 243; No Effect Level= 75 mg/L
Fathead Minnow 7 Day Static Renewal Bioassay
IC25 = 56 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 105; No Effect Level= 75 mg/L
Mysid Shrimp 48 Hour Static Acute Bioassay
LC50= 166; No Effect Level= 10 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
LC50= 34; No Effect Level= 15 mg/L
Sheepshead Minnow 48 Hour Static Acute Bioassay

LC50= 475; No Effect Level= 370 mg/L

BIODEGRADATION

BOD-28 (mg/g): 22
BOD-5 (mg/g): 4
COD (mg/g): 810
TOC (mg/g): 280

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD:	Corrosive to skin
PROPER SHIPPING NAME:	CAUSTIC ALKALI LIQUIDS, N.O.S.(SODIUM TOLYLTRIAZOLE)
	8, UN 1719, PG II

DOT EMERGENCY RESPONSE GUIDE #: 154
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: Not Registered

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		CODE TRANSLATION
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	28-JAN-1997		** NEW **
	19-FEB-1997	12	28-JAN-1997
	03-OCT-1997	8	19-FEB-1997
	29-MAY-1998	12	03-OCT-1997
	08-FEB-1999	3,5,14	29-MAY-1998
	15-JUN-1999	12	08-FEB-1999
	30-AUG-1999	4;EDIT:9	15-JUN-1999
	03-MAY-2000	12	30-AUG-1999
	05-FEB-2009	12;EDIT:Rebranding	03-MAY-2000

Water & Process Technologies

Fact Sheet

Inhibitor AZ8100

Copper Corrosion Inhibitor

- Inhibits corrosion of copper alloys
- Reduces tube failures
- Extends condenser service life
- Minimizes mild steel corrosion caused by galvanic reaction

Description and Use

Inhibitor AZ8100 is a specially-formulated corrosion inhibitor which establishes a protective film on copper alloy condensers. Inhibitor AZ8100 effectively inhibits the corrosion of copper alloy surfaces. Indirectly, it also reduces the corrosion of steel surfaces when the corrosion is the result of a galvanic reaction between the steel surface and the products of copper corrosion which have been deposited on the steel. Figure 1 shows the reduction in corrosion rate for both admiralty brass and mild steel in a West Coast power plant through use of Inhibitor AZ8100.

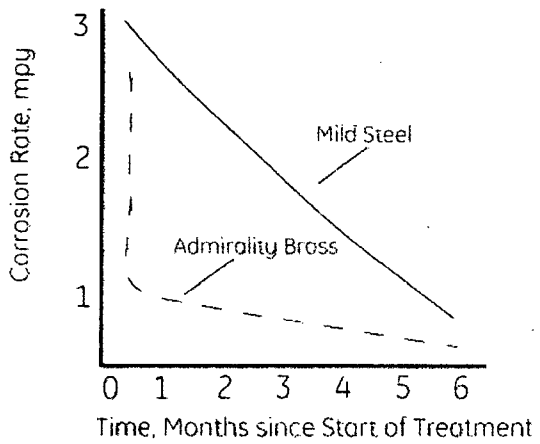

Figure 1: Effect of Inhibitor AZ8100 on the corrosion rates of admiralty brass and of mild steel. (The latter is caused by galvanic reaction between admiralty corrosion products and the mild steel surface.)

Treatment and Feeding Requirement

The normal treatment level for Inhibitor AZ8100 is 4-30 ppm(mg/L). The amount required will depend on many factors, such as operating characteristics of the system and severity of the problem. Therefore, this product should be used in accordance with control parameters GE establishes for a specific application.

Inhibitor AZ8100 should be fed to a point in the cooling system where turbulence and flow patterns will ensure adequate mixing of the product with the cooling water. In recirculating cooling systems the product should be fed continuously to maintain constant residuals in the cooling water. Intermittent product feed is applicable in certain cooling systems.

Inhibitor AZ8100 may be fed directly from the shipping container or diluted with water to any convenient feeding strength.

Mild steel tanks, pumps, and piping are satisfactory for use with Inhibitor AZ8100.

General Properties

Physical properties of Inhibitor AZ8100 are shown on the Material Safety Data Sheet, a copy of which is available on request.

Packaging Information

Inhibitor AZ8100 is available in a variety of containers and delivery methods. Contact your GE sales representative for details.

Safety Precautions

A Material Safety Data Sheet containing detailed information about this product is available upon request.

Global Headquarters
Trevose, PA
215-355-3300

Americas
Minnetonka, MN
952-933-2277

Europe/Middle East/Africa
Heverlee, Belgium
32-16-40-20-00

Asia/Pacific
Shanghai, China
86-21-5298-4573

CPFC58EN 0410

GE
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 05-FEB-2009
Supercedes: 31-OCT-2008

SPECTRUS BD1500

1 Identification

Identification of substance or preparation
SPECTRUS BD1500

Product Application Area
Water-based deposit control agent.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 05-FEB-2009

2 Hazard(s) identification

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EMERGENCY OVERVIEW

CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable
Odor: Slight; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: *dry chemical, carbon dioxide, foam or water*

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:
May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

4 First-aid measures

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water
HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of carbon
FLASH POINT:
> 200F > 93C SETA(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:
Alkaline. Do not mix with acidic material.
STORAGE:
Keep containers closed when not in use. Reasonable and safe chemical storage.

8 Exposure controls / personal protection

EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

ENGINEERING CONTROLS:
adequate ventilation
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.
SKIN PROTECTION:
rubber, butyl or viton gloves -- Wash off after each use. Replace as necessary.
EYE PROTECTION:
splash proof chemical goggles

9 Physical and chemical properties

Specific Grav.(70F,21C)	1.020	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	31	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-1		
Viscosity(cps 70F,21C)	30	% Solubility (water)	100.0

Odor		Slight
Appearance		Colorless
Physical State		Liquid
Flash Point	SETA(CC)	> 200F > 93C
pH As Is (approx.)		12.5
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.
POSSIBILITY OF HAZARDOUS REACTIONS:

INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
oxides of carbon

11 Toxicological information

Oral LD50 RAT:	>4,600 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 Ecological information

AQUATIC TOXICOLOGY

Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50 Greater Than= 3000 mg/L
Ceriodaphnia 7 Day Static Renewal Bioassay
IC25 = 652 mg/L
Daphnia magna 48 Hour Static Acute Bioassay
0% Mortality= 2000 mg/L
Fathead Minnow 7 Day Static Renewal Bioassay
IC25 = 3000; LC50 Greater Than= 3000 mg/L
Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal
0% Mortality= 2000 mg/L
Menidia beryllina (Silversides) 96 Hour Static Acute Bioassay
0% Mortality= 5000 mg/L
Mysid Shrimp 96 Hour Static Acute Bioassay
25% Mortality= 5000; No Effect Level= 2500 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
No Effect Level= 3000 mg/L

No Data Available.

BIODEGRADATION

BOD-28 (mg/g): 5
BOD-5 (mg/g): 4
COD (mg/g): 341
TOC (mg/g): 80

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D002=Corrosive(pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD: Not Applicable
PROPER SHIPPING NAME:

DOT EMERGENCY RESPONSE GUIDE #: Not applicable
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

FOOD AND DRUG ADMINISTRATION:

21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: 141059
Category Code(s):

SARA SECTION 312 HAZARD CLASS:

Product is non-hazardous under Section 311/312

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	14-JUL-1997		** NEW **
	09-SEP-1998	15	14-JUL-1997
	15-SEP-1998	15	09-SEP-1998
	25-JUN-1999	11	15-SEP-1998
	02-APR-2001	12	25-JUN-1999
	25-JUN-2001	15	02-APR-2001
	05-OCT-2001	4,16	25-JUN-2001
	10-JAN-2002	15	05-OCT-2001
	18-JAN-2002	15	10-JAN-2002
	07-FEB-2006	12	18-JAN-2002
	10-JUL-2008	4,8,11,15	07-FEB-2006
	31-OCT-2008	11	10-JUL-2008
	05-FEB-2009	12	31-OCT-2008

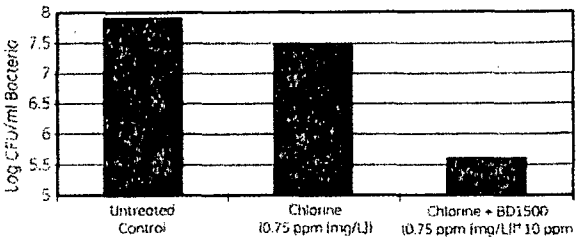
Water & Process Technologies

Fact Sheet

Spectrus™ BD1500

Biocide Enhancer

- Improves the ability of biocides to control microbiological fouling
- Can be used with both oxidizing and non-oxidizing biocides
- Compatible with all GE water treatment programs



Spectrus BD1500 Improves Performance of Halogen

Description and Use

Spectrus™ BD1500 is a blend of non-ionic ingredients specifically formulated to assist in the control of microbiological fouling in industrial water systems. Control of microbiological populations in industrial water systems is essential to prevent biofouling. In cooling systems, biofouling of heat exchange equipment and tower fill reduces heat transfer efficiency and can force unscheduled shutdowns and extended turnarounds leading to lost production. Equipment can also be damaged as a result of microbiologically influenced corrosion (MIC) associated with biofouling. Consequently, biofouling must be prevented in order for operating units to avoid such events and achieve profit goals.

Although Spectrus BD1500 has no biocidal activity of its own, it can significantly enhance the effectiveness of biocides applied to industrial water systems (see chart). Spectrus BD1500 can be used with oxidizing biocides (such as chlorine, bromine, or chlorine dioxide) as well as nonoxidizing biocides.

Spectrus BD1500 is especially useful when acceptable control of biological activity cannot be achieved with biocides alone. For example the use of this product may be indicated where biocide usage or biocide discharge is limited by environmental regulations.

Treatment and Feeding Requirements

The typical feed range for Spectrus BD1500 ranges from 10 to 50 ppm (mg/L) in the cooling water. Actual dosage and frequency of Spectrus BD1500 addition will depend on many factors. These include, but are not limited to, system cleanliness, types of microbes, nutrient concentrations, temperature, pH, retention time, and other system operating characteristics. Microbiological monitoring is recommended to evaluate product requirements. Consult your GE representative for technical advice on your specific application.

Spectrus BD1500 should be fed in conjunction with biocides that are EPA approved for use in industrial water systems. If the biocide is fed continuously (e.g., continuous chlorination), feed Spectrus BD1500 continuously as well. In such systems, feed Spectrus BD1500 at a rate sufficient to generate the desired treatment residual (typically 5 to 15 ppm [mg/L]) in the blowdown of recirculating cooling systems or in the total water flow of once-through cooling systems. In once-through cooling systems and other systems that that are halogenated intermittently, begin feeding 5 to 15 ppm (mg/L) of Spectrus BD1500 30 minutes to 1 hour prior to the start of halogenation and continue for the duration of the halogen feed period. If the biocide is slug-fed, apply Spectrus BD1500 in a similar fashion. Base the quantity fed on the total system volume.

Visit us online at www.gewater.com

Global Headquarters
Trevose, PA
215-355-3300

Americas
Minnetonka, MN
952-933-2277

Europe/Middle East/Africa
Heverlee, Belgium
32-16-40-20-00

Asia/Pacific
Shanghai, China
86-21-5298-4573

PFC721EN 0410

Spectrus BD1500 has the potential to cause foaming, especially at higher dosages. If foam is a concern, have an antifoam available when using this product.

Feed point - Apply Spectrus BD1500 to a point in the system where turbulence and flow patterns assure good mixing with the water being treated.

Dilution - This blended product is best fed neat (undiluted) from the storage container. If necessary (e.g,. for feeding from a day tank), the product can be diluted with water.

Compatible Materials - Spectrus BD1500 is compatible with the following materials of construction: Low Carbon Steel, Stainless Steel, Copper, Brass, PVC, High Density Cross-linked Polyethylene, Polypropylene, Kynar, Teflon, Nylon, Viton A, Buna N, Urethane, Neoprene, Natural Rubber, Viton Litharge. (Kynar is a registered trademark of Autofina Chemicals, Teflon and Viton are registered trademarks of DuPont.)

Avoid - Aluminum, High and Low Density Un-Crosslinked Polyethylene, Polysulfide, Hypalon, Buna S, Tygon. (Tygon is a registered trademark of Norton Co.)

General Properties

Physical properties of Spectrus BD1500 are shown on the Material Safety Data Sheet, a copy of which is available on request.

Packaging Information

Spectrus BD1500 is a liquid and is available in a wide variety of containers and delivery methods, including GE's ChemSure™ Drumless Delivery Services

Storage

Store Spectrus BD1500 at moderate temperatures. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use.

Safety Precautions

A Material Safety Data Sheet containing detailed information about this product is available upon request.

OxyChem®

Responsible Care®
Good Chemistry at Work

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY INFORMATION

Occidental Chemical Corporation
5005 LBJ Freeway, Suite 2200
P.O. Box 809050
Dallas, Texas 75380-9050

24 HOUR EMERGENCY TELEPHONE:	**1-800-733-3665 or 1-972-404-3228 (U.S.);** **32.3.575.55.55 (Europe);** **1800-033-111 (Australia)**
TO REQUEST AN MSDS:	**MSDS@oxy.com or 1-972-404-3245**
CUSTOMER SERVICE:	**1-800-752-5151 or 1-972-404-3700**

MSDS NUMBER: M31040

SUBSTANCE: TOWERBROM(R) 60M GRANULES

PRODUCT USE: algaecide, microbiocide/microbiostat, disinfectant, bactericide, fungicide

REVISION DATE: Feb 22 2008

2. HAZARDS IDENTIFICATION

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

GHS CLASSIFICATION:
Acute toxicity, Category 3

GHS SYMBOL:

GHS SIGNAL WORD: DANGER

GHS HAZARD STATEMENT:
Toxic if inhaled
Harmful if swallowed
May be harmful in contact with skin

EMERGENCY OVERVIEW:
COLOR: white
PHYSICAL FORM: granules
ODOR: bromine odor
SIGNAL WORD: DANGER
MAJOR HEALTH HAZARDS: CORROSIVE. CAUSES IRREVERSIBLE EYE DAMAGE. MAY CAUSE BURNS TO MOIST SKIN IF NOT PROMPTLY REMOVED. HARMFUL IF SWALLOWED OR ABSORBED THROUGH THE SKIN. IRRITATING TO NOSE AND THROAT.
PHYSICAL HAZARDS: Strong oxidizer.
ECOLOGICAL HAZARDS: This material is toxic to fish and aquatic organisms.
PRECAUTIONARY STATEMENTS: Do not get in eyes, on skin, or on clothing. Do not breathe dust, vapor or spray mist. Wear goggles, faceshield or safety glasses. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

POTENTIAL HEALTH EFFECTS:
INHALATION:
This material in the form as sold is not expected to produce respiratory effects. Particles of respirable size are generally not encountered. The respirable fraction is typically less than 0.1% by weight. If ground or otherwise in a powdered form, effects similar to a corrosive substance may occur. May cause severe irritation of the respiratory tract with coughing, choking, pain and possibly burns of the mucous membranes. If significant or prolonged exposure occurs, pulmonary edema may develop, either immediately or more often within a period of 5-72 hours. The symptoms may include tightness in the chest, dyspnea, frothy sputum, cyanosis, and dizziness. Physical findings may include moist rales, low blood pressure and high pulse pressure. Severe cases may be fatal.
SKIN CONTACT:
This material is corrosive to the skin. Direct contact with wet material or moist skin may cause severe irritation, pain, and possibly burns. Dry material is less irritating than wet material. This material is not a skin sensitizer based on studies with guinea pigs.
EYE CONTACT:
This material is corrosive to the eye. Direct contact may cause severe irritation, pain and burns, possibly severe, and permanent damage including blindness. The degree of injury depends on the concentration and duration of contact.
INGESTION:

Ingestion may cause immediate pain and severe burns of the mucous membranes. There may be discoloration of the tissues. Swallowing and speech may be difficult at first and then almost impossible. The effects on the esophagus and gastrointestinal tract may range from irritation to severe corrosion. Edema of the epiglottis and shock may occur. Acute ingestion exposure may also cause CNS depression, coma, hypertension, tachycardia, and respiratory distress.

TARGET ORGANS: cardiovascular system, kidneys, bladder
CHRONIC EFFECTS:
Based on animal studies, exposure to concentrations of monosodium cyanurate at the solubility limit may cause cardiovascular, kidney and urinary bladder effects. Depending on the concentration and duration of exposure, repeated or prolonged inhalation exposure may cause inflammatory and ulcerative changes in the upper respiratory tract. Although not a likely route of exposure, prolonged ingestion exposure may cause behavioral changes, irritability, headache, confusion, anorexia, slurred speech, and lethargy.

CARCINOGEN STATUS:
OSHA: No
NTP: No
IARC: No

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT: SODIUM DICHLORO-S-TRIAZINETRIONE
CAS NUMBER: 2893-78-9
PERCENTAGE: 88-90

COMPONENT: SODIUM BROMIDE
CAS NUMBER: 7647-15-6
PERCENTAGE: 6-8

COMPONENT: SODIUM CHLORIDE
CAS NUMBER: 7647-14-5
PERCENTAGE: 0.1-1.5

COMPONENT: WATER
CAS NUMBER: 7732-18-5
PERCENTAGE: 0.5-3

4. FIRST AID MEASURES

INHALATION: Move person to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a

trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/Automatic External Defibrillator) and CALL FOR EMERGENCY SERVICES IMMEDIATELY.

SKIN CONTACT: Immediately flush contaminated areas with water. Remove contaminated clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. IF IRRITATION OCCURS, GET MEDICAL ATTENTION.

EYE CONTACT: Immediately flush eyes with a directed stream of water for at least 15 minutes, forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissues. Washing eyes within several seconds is essential to achieve maximum effectiveness. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION: Never give anything by mouth to an unconscious or convulsive person. If swallowed, do not induce vomiting. Give water. If vomiting occurs spontaneously, keep airway clear. Give more water when vomiting stops. GET MEDICAL ATTENTION IMMEDIATELY.

NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard. If heated by outside source to temperatures above 240 C (464 F), this product will undergo self-substaining decomposition with the evolution of noxious gases but no visible flame. Wet material may generate bromine or nitrogen trichloride, an explosion hazard.

EXTINGUISHING MEDIA: Flood with water. Do not use dry chemicals, carbon dioxide or halogenated extinguishing agents.

FIRE FIGHTING: Consider evacuation of personnel located downwind. Keep unnecessary people away, isolate hazard area and deny entry. Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Wear NIOSH approved positive-pressure self-contained breathing apparatus in pressure-demand mode. Material which appears undamaged except for being damp on the outside, should be opened and inspected immediately. DO NOT attempt to reseal contaminated drums. Damp material should be neutralized to a non-oxidizing state. Contact OxyChem for instructions for handling and disposal of damp material.

SENSITIVITY TO MECHANICAL IMPACT: Not sensitive

SENSITIVITY TO STATIC DISCHARGE: Not sensitive

FLASH POINT: Not applicable

HAZARDOUS COMBUSTION PRODUCTS:
Thermal decomposition or combustion products: chlorine, bromine, nitrogen, nitrogen trichloride, cyanogen chloride, oxides of carbon, phosgene

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Spills should be cleaned up as soon as possible. Keep unnecessary people away, isolate hazard area and deny entry. DO NOT add water to spilled materials. DO NOT use floor sweeping compounds to clean up spills. Sweep and scoop spilled material into clean, dedicated equipment. Every attempt should be made to avoid mixing spilled material with other chemicals or debris when cleaning up. DO NOT attempt to reseal contaminated drums. DO NOT transport wet or damp material. Damp material should be neutralized to a non-oxidizing state. Contact OxyChem for instructions for handling and disposal of damp material. Keep out of water supplies and sewers. Releases should be reported, if required, to appropriate agencies.

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. (NFPA Oxidizer Class 3.) Do not allow water to get in container. If liner is present, tie after each use. Keep container tightly closed and properly labeled. Store containers on pallets. Keep away from food, drink and animal feed. Keep separated from incompatible substances.

HANDLING: Do not get in eyes, on skin, or on clothing. Avoid breathing vapors or dust when opening container. Avoid creation of dust. Wash thoroughly after handling. Never add water to this product. Always add product to large quantities of water. Use clean, dry utensils. Do not add the product to any dispensing device containing residuals of other products.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:
TOWERBROM(R) 60M GRANULES:
Bromine may be found in slight amounts in the head space of containers of Towerbrom® Products.

SODIUM DICHLORO-S-TRIAZINETRIONE:
0.5 mg/m3 recommended TWA 8 hour(s) (internal Occupational Exposure Limit)

BROMINE:
0.1 ppm (0.7 mg/m3) OSHA TWA
0.3 ppm (2 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
0.1 ppm ACGIH TWA
0.2 ppm ACGIH STEL

BIOLOGICAL LIMIT VALUES:
TOWERBROM(R) 60M GRANULES:
No biological limit value(s) available.

VENTILATION: Use only in well ventilated areas. Provide local exhaust ventilation where dust or mist may be generated. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear chemical safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear protective clothing to minimize skin contact. When potential for contact with dry material exists, wear disposable coveralls suitable for dust exposure, such as Tyvek®. Contaminated clothing should be removed and laundered before reuse.

GLOVES: Wear appropriate chemical resistant gloves.

PROTECTIVE MATERIAL TYPES: butyl rubber, natural rubber, neoprene, nitrile, polyvinyl chloride (PVC), Tyvek®

RESPIRATOR: A NIOSH approved respirator with N95 (dust, fume, mist) filters may be permissible under certain circumstances.
The added protection of a full face piece respirator is required when visible dusty conditions are encountered and/or eye irritation is a potential.
Acid gas cartridges with N95 filters are required when fumes or vapor may be generated.
A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant the use of a respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid
COLOR: white
PHYSICAL FORM: granules
ODOR: bromine odor
BOILING POINT: Not applicable
MELTING POINT: decomposes without melting
FLASH POINT: Not applicable
DECOMPOSITION POINT: 486 F (252 C)
VAPOR PRESSURE: Not available
VAPOR DENSITY: Not applicable
SPECIFIC GRAVITY (water=1): Not applicable
BULK DENSITY: 61-65 lbs/ft3 (loose)
WATER SOLUBILITY: Not available
PH: 6-7 @ 25 C (1% solution)
VOLATILITY: Not applicable
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Do not get water inside container. Wet material may generate bromine or nitrogen trichloride, an explosion hazard. Avoid contact with easily oxidizable organic material.

INCOMPATIBILITIES: acids, ammonia, bases, floor sweeping compounds, calcium hypochlorite, reducing agents, organic solvents and compounds

HAZARDOUS DECOMPOSITION:
Thermal decomposition or combustion products: chlorine, bromine, nitrogen, nitrogen trichloride, cyanogen chloride, oxides of carbon, phosgene

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TOWERBROM(R) 60M GRANULES:
IRRITATION DATA: PRIMARY EYE IRRITATION: Severe Irritation, Corrosive (rabbit, 24 hr) PRIMARY SKIN IRRITATION: Severe Irritation, (rabbit, 4 hr);
TOXICITY DATA: 710 mg/kg oral-rat LD50; >2000 mg/kg skin-rabbit LD50; 0.60 mg/L/4 hour(s) inhalation-rat LC50; CHRONIC EXPOSURE: Monosodium cyanurate was administered via drinking water to rats for 104 weeks at concentrations of 0, 400, 1200, 2400, and 5375 ppm (solubility limit). No compound-related effects on body weights, clinical signs of toxicity or food or water consumption were noted during the study. An increased incidence of gross lesions in the urinary tract, calculi in the kidney and lesions in the heart were observed in males receiving the highest dose level of 5375 ppm (solubility limit). The health effects seen in this study were due to precipitation of the test substance in the urinary tract when the test substance was fed at the solubility limit. Adverse health effects were not seen at lower doses where precipitation did not occur. MUTAGENIC DATA: Not mutagenic in 5 salmonella strains and 1 E. coli strain with or without mammalian microsomal activation. REPRODUCTIVE EFFECTS DATA: There are no known or recorded effects on reproductive function or fetal development. A 7 month diet rat study with sodium bromide followed with a 3 month control diet in the reversibility group showed complete infertility at the highest dose. No treatment–related effects were observed in reproductive performance, viability and bodyweight of the offspring in the second and third generations. Results of the reversibility group showed clearly that the effects of bromide on reproduction are reversible.
CARCINOGEN STATUS: THIS SUBSTANCE IS NOT A KNOWN CARCINOGEN.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:
FISH TOXICITY: Sodium Dichloroisocyanurate/Sodium Bromide Formulation: This material is believed to be highly toxic to aquatic life. 0.4 mg/L 48 hour(s) LC50 Fathead Minnow; 1.5 mg/L 96 hours LC50 Inland Silverside;

INVERTEBRATE TOXICITY: Sodium Dichloroisocyanurate/Sodium Bromide Formulation: 1.35 mg/L 48 hour(s) LC50 Daphnia magna; 2.4 mg/L 96 hours LC50 Mysid Shrimp

ALGAL TOXICITY: 0.3 mg/L 96 hour(s) EC50 Selenastrum

FATE AND TRANSPORT:
BIODEGRADATION: This material is subject to hydrolysis. Cyanuric acid produced by hydrolysis is biodegradable.

PERSISTENCE: This material is believed not to persist in the environment. Free available halogen is rapidly consumed by reaction with organic and inorganic materials to produce chloride and bromide ions. The stable degradation products are chloride and bromide ions and cyanuric acid.

BIOCONCENTRATION: Trichloroisocyanuric acid hydrolyzes in water liberating chlorine and cyanuric acid. These products are not bioaccumulative.

OTHER ECOLOGICAL INFORMATION: This material is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product into sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of EPA.

13. DISPOSAL CONSIDERATIONS

Use or reuse if possible. This material is a registered pesticide. Dispose in accordance with all applicable regulations. Do not put product, spilled product, or filled or partially filled containers into the trash or waste compactor. Contact with incompatible materials could cause a reaction and fire. DO NOT transport wet or damp material. Damp material should be neutralized to a non-oxidizing state. Contact OxyChem for instructions for handling and disposal of damp material. See product label for container disposal information. May be subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Dichloroisocyanuric acid salts mixture
ID NUMBER: UN2465
HAZARD CLASS OR DIVISION: 5.1

PACKING GROUP: II
LABELING REQUIREMENTS: 5.1

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Dichloroisocyanuric acid salts mixture
UN NUMBER: UN2465
CLASS: 5.1
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): Not regulated.

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

OTHER U.S. REGULATIONS: Federal Insecticide, Fungicide and Rodenticide Act (FIFRA): Registered pesticide (40 CFR 152).

STATE REGULATIONS:
California Proposition 65: Not regulated.

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW:
REPORTING REQUIREMENT:
SODIUM DICHLORO-S-TRIAZINETRIONE 2893-78-9 88-90%
SODIUM BROMIDE 7647-15-6 6-8%
SODIUM CHLORIDE 7647-14-5 0.1-1.5%

SPECIAL HEALTH HAZARD SUBSTANCE LIST:
SODIUM DICHLORO-S-TRIAZINETRIONE 2893-78-9 88-90% (Reactive)

PENNSYLVANIA RIGHT TO KNOW:

REPORTING REQUIREMENT:
SODIUM DICHLORO-S-TRIAZINETRIONE 2893-78-9 88-90%
SODIUM BROMIDE 7647-15-6 6-8%

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: Material is regulated as a pesticide, therefore is not regulated under WHMIS.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): All the components of this substance are listed on or are exempt from the inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): All components of this product are listed on either the DSL or the NDSL.

16. OTHER INFORMATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=0 REACTIVITY=2

HMIS RATINGS (SCALE 0-4): HEALTH=3* FLAMMABILITY=0 REACTIVITY=2

This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems. Rated using 2nd Edition HMIS Instructions.

MSDS SUMMARY OF CHANGES
1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION
2. HAZARDS IDENTIFICATION
3. COMPOSITION, INFORMATION ON INGREDIENTS
4. FIRST AID MEASURES
5. FIRE FIGHTING MEASURES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION
9. PHYSICAL AND CHEMICAL PROPERTIES
11. TOXICOLOGICAL INFORMATION
12. ECOLOGICAL INFORMATION
13. DISPOSAL CONSIDERATIONS
15. REGULATORY INFORMATION

Standard 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a hazard communication program including labeling, material safety data sheets, training and access to written records. We request that you, and it is your legal duty to, make all information in this Material Safety Data Sheet available to your employees.

IMPORTANT: The information presented herein, while not guaranteed, was prepared by competent technical personnel and is true and accurate to the best of our knowledge. NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SUITABILITY, STABILITY OR OTHERWISE. The information included herein is not intended to be all-inclusive as to the appropriate manner and/or conditions of use, handling and/or storage. Factors pertaining to certain conditions of storage, handling, or use of this product may involve other or additional safety or performance considerations. While our technical personnel will be happy to respond to questions regarding safe handling and use procedures, safe handling and use remains the responsibility of the customer. No suggestions for use are intended to, and nothing herein shall be construed as a recommendation to, infringe any existing patents or violate any laws, rules, regulations or ordinances of any governmental entity.

OxyChem®

Responsible Care®
Good Chemistry at Work

ACL® Chlorinated Isocyanurates

SALES SPECIFICATION

TOWERBROM® 60M Granules

Towerbrom 60M is an OxyChem trade name for this blend of sodium dichloro-s-triazinetrione and sodium bromide. This product is registered by the United States Environmental Protection Agency as a microbicide for various industrial water treatment applications (EPA Registration No. 935-71). Contact OxyChem for private labeling options.

Property	Specification
Appearance	White to off-white, free flowing granules
Available Halogen, % (as chlorine)	57.0 Minimum
Sodium Bromide, %	7
Packaging	50 lb. / 22.7 kg. plastic pails

Occidental Chemical Corporation
A subsidiary of Occidental Petroleum Corporation

Occidental Tower
5005 LBJ Freeway
Dallas, Texas 75244-6119
800-752-5151

GE
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 23-JAN-2008
Supercedes: 23-JAN-2008

SPECTRUS OX1200

1 Identification

Identification of substance or preparation
SPECTRUS OX1200

Product Application Area
Solid microbial control agent.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 23-JAN-2008

2 Hazard(s) identification

****

EMERGENCY OVERVIEW

DANGER

Moderately irritating. May be corrosive in contact with moist skin. Severe irritant to the eyes. Dusts cause irritation to the upper respiratory tract.

DOT hazard: Oxidizer
Odor: Slight; Appearance: White, Granules

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: Flood with water. Use of CO2 or foam may not be effective.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Moderately irritating. May be corrosive in contact with moist skin.

ACUTE EYE EFFECTS:
Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:
Dusts cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of the gastrointestinal tract.

TARGET ORGANS:
Repeated skin contact may cause sensitization.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range(w/w%)
16079-88-2	1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN Oxidizer; irritant (eyes and skin)	60-100

4 First-aid measures

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Immediately contact a physician.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).
EXTINGUISHING MEDIA:
Flood with water. Use of CO2 or foam may not be effective.
HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, hydrogen chloride, and hydrogen bromide
FLASH POINT:
> 200F > 93C P-M(CC)
MISCELLANEOUS:
Oxidizer
UN 1479;Emergency Response Guide #140

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Product releases chlorine when wet. Spill residue may be neutralized with 3% hydrogen peroxide solution.
DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

7 Handling and storage

HANDLING:
Oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids.
STORAGE:
Keep containers closed when not in use. Keep dry. Do not store at high temperature or near oxidizables or combustibles. Shelf life 270 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

CHEMICAL NAME

1-BROMO-3-CHLORO-5,5-DIMETHYLHYDANTOIN
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.
PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I
RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS. If air-purifying respirator use is appropriate, use a respirator with acid gas cartridges and dust/mist prefilters.

SKIN PROTECTION:
gauntlet-type butyl or rubber gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
airtight chemical goggles

9 Physical and chemical properties

Density	NO DATA	Vapor Pressure (mmHG)	< 1.0
Freeze Point (F)	NA	Vapor Density (air=1)	< 1.00
Freeze Point (C)	NA		
Viscosity(cps 70F,21C)	NA	% Solubility (water)	0.2

Odor		Slight
Appearance		White
Physical State		Granules
Flash Point	P-M(CC)	> 200F > 93C
pH 5% Disp. (approx.)		4.7
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

STABILITY:
Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:
Will not occur.

INCOMPATIBILITIES:
Slowly releases halogen gases when contaminated with moisture. May react with alkalies, acids, organics or reducing agents.

DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, hydrogen chloride, and hydrogen bromide

11 Toxicological information

Oral LD50 RAT: 578 mg/kg
NOTE - 600 mg/kg per alt. source; dehalogenated byproduct rat oral LD50: >4,000 mg/kg

Teratology RAT:
NOTE - Dehalogenated byproduct study had terata (secondary) at maternal toxic doses

Reproductive Toxicity RAT: 4,500 mg/kg/day
NOTE - Dehalogenated byproduct study had no adverse reproductive toxicity

Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Alternate source concurs

Inhalation LC50 RAT: 1.88 mg/L/4hr
NOTE - >3.2 mg/L/4hr at 100 ppm (no deaths) per alternate source

Skin Irritation Score RABBIT: 6.1
NOTE - 6.98 per alternate source; reversible; dehalogenated byproduct score: 0.8
Eye Irritation Score RABBIT: 103
NOTE - 14 day-irreversible-max.at day 3; dehalogenated byproduct score: 12.8-reversible
90 Day Feed Study RAT:
NOTE - Dehalogenated byproduct 90-day oral LD50: >2,000 mg/kg/day
Skin Sensitization G.PIG: POSITIVE
NOTE - Buehler Test; Dehalogenated byproduct was negative in Buehler Test
Ames Assay BACTERIA: NEGATIVE
NOTE - +/- metabolic activation; Dehalogenated byproduct: negative
Non-Ames Mutagenicity YEAST: NEGATIVE
NOTE - Dehalogenated byproduct negative for: Mouse Lymphoma, SCE, Cell Transformation

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Acute Bioassay
LC50= .47; No Effect Level= .31 mg/L
Fathead Minnow 96 Hour Static Acute Bioassay
LC50= 2.34; No Effect Level= 1.8 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay
LC50= .9; No Effect Level= .52 mg/L
Sheepshead Minnow 96 Hour Static Acute Bioassay
LC50= 20.8; No Effect Level= 11.6 mg/L

BIODEGRADATION

BOD-28 (mg/g): 11
BOD-5 (mg/g): 6
COD (mg/g): 938
TOC (mg/g): 255

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
D001=Ignitable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD: Oxidizer
PROPER SHIPPING NAME: OXIDIZING SOLID N.O.S.(Bromo-3-Chloro-5, 5-Dimethylhydantoin) 5.1, UN 1479, PG II
DOT EMERGENCY RESPONSE GUIDE #: 140
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:
This is an EPA registered biocide and is exempt from TSCA inventory requirements.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

FIFRA REGISTRATION NUMBER:
3876- 150

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.300 (slimicides for wet end use)
When used in this specified application, all ingredients comprising this product are authorized by FDA for the manufacture of paper and paperboard that may contact aqueous and fatty foods as per 21 CFR 176.170(a)(4).

NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: 140723
Category Code(s):
G5 Cooling and retort water treatment products - all food processing areas
G7 Boiler treatment products - all food processing areas/nonfood contact

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic);Fire;Reactive

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		**CODE TRANSLATION**
Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	1	Slight Hazard
Special	OXY	DOT or NFPA Oxidizer
(1) Protective Equipment	C	Goggles,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	24-SEP-1997		** NEW **
	03-OCT-1997	8	24-SEP-1997
	02-DEC-1997	15	03-OCT-1997
	23-DEC-1997	15	02-DEC-1997

15-JAN-1998	15	23-DEC-1997
01-JUL-1998	15	15-JAN-1998
14-SEP-1999	;EDIT:9	01-JUL-1998
11-MAY-2000	4;EDIT:9	14-SEP-1999
22-SEP-2000	8	11-MAY-2000
22-MAR-2001	15	22-SEP-2000
01-JUN-2001	15	22-MAR-2001
18-FEB-2002	3,4	01-JUN-2001
19-FEB-2002	3,4	18-FEB-2002
20-FEB-2002	3,4	19-FEB-2002
23-JAN-2008	4,5,7,8,10	20-FEB-2002

Water & Process Technologies

Fact Sheet

Spectrus™ OX1200

Microbiological Control Agent

- Broad spectrum antimicrobial
- Fast dissolving, granular bromine donor
- Very effective in NH_3 contaminated and alkaline waters
- Safe replacement for chlorine gas
- USDA Approved (G-5, G-7)
- NSF Potable approval
- Approved for sale in California

Description and Use

Spectrus™ OX1200 is an effective, broad spectrum microbiological control agent that contains stabilized halogen in a concentrated granular form. As granules dissolve in water, active bromine and chlorine are released in a controlled fashion. Bromine and chlorine work together to control microbes such as bacteria, fungi, and algae.

Control of microbiological populations in industrial water system is essential to prevent biofouling. In cooling systems, biofouling of heat exchange equipment and tower fill reduces heat transfer efficiency and can force unscheduled shutdowns and extended turnarounds, leading to lost production. Biofouling can also damage equipment through microbiologically influenced corrosion (MIC). As a result of these effects, biofouling must be prevented in order for operating units to achieve profitability goals.

Spectrus OX1200 contains 96% 1-bromo-3-chloro-5, 5-dimethyl hydantoin. It is EPA-approved for use in a variety of industrial water systems including: recirculating cooling systems, once-through cooling systems, air washers, brewery pasteurizers, water-based scrubbers, and influent water systems.

Spectrus OX1200 has been granted potable certification by the NSF (National Sanitation Foundation). NSF certification allows Spectrus OX1200 to be applied to EPA registered end-use areas where potable water take-offs may be downstream of the product feedpoint. NSF has certified that a feedrate of 3 ppm (mg/L) Spectrus OX1200 (as product) is safe for use in finished drinking water. NSF certification does not imply that Spectrus OX1200 can be used in end-use patterns that are not already EPA approved. A complete listing of EPA registered end-uses can be found on the product label.

Treatment and Feeding Requirements

Spectrus OX1200 is best applied through a bypass feeder to achieve consistent and effective product residuals throughout a system. GE offers a full range of Solid Halogen Feeders which can be used for continuously feeding or shot-feeding Spectrus OX1200.

Fast-dissolving, granular Spectrus OX1200 is particularly well suited to shot-feeding. Shot-feeding has proven to be the most cost-effective mode for preventing biofouling of heat exchange equipment or tower fill. Shot-feeding Spectrus OX1200 also allows biofouling control of utility surface condensers without exceeding total residual oxidant discharge limits.

Continuous application of Spectrus OX1200 can be employed where it is necessary to maintain a constant halogen residual in a water supply or where it is necessary to deliver water of a certain microbiological quality on a 24-hour basis.

Correct treatment levels and frequency of Spectrus OX1200 addition depend on many factors. These include, but are not limited to, system cleanliness,

Visit us online at www.gewater.com

Global Headquarters
Trevose, PA
215-355-3300

Americas
Minnetonka, MN
952-933-2277

Europe/Middle East/Africa
Heverlee, Belgium
32-16-40-20-00

Asia/Pacific
Shanghai, China
86-21-5298-4573

PFC731EN 0410

types of microbes, nutrient concentrations, tempera ture, pH, retention time, and other system operating characteristics. Consult the product label for general dosage guidelines. Microbiological monitoring is recommended to evaluate product requirements. Consult your GE representative for technical advice on your specific application.

In all cases, this product must be applied in accordance with use instructions on the Spectrus OX1200 label.

Compatible Materials - Spectrus OX1200 is compatible with the following materials of construction: High Density, Cross-linked Polyethylene; Teflon; PVC; PVDF (Kynar); Fiberglass Reinforced Plastic; Litharge Viton. (Teflon is a registered trademark of DuPont, Kynar is a registered trademark of Autofina Chemicals.)

Avoid: Linear Polyethylene; Neoprene; Buna N; Buna S; Ethylene Propylene Resin. Because of its halogen contact, most metals will experience corrosion when in direct contact with Spectrus OX1200 granules.

General Properties

Physical properties of Spectrus OX1200 are shown on the Material Safety Data Sheet, a copy of which is available on request.

Packaging Information

Spectrus OX1200 is supplied as a dry granule and is available in a variety of container and delivery methods. Consult your GE representative for details.

Storage

Store in closed container when not in use. Keep product dry. Do not store at high temperature or near oxidizables or combustibles. Do not contaminate.

Safety Precautions

A Material Safety Data Sheet containing detailed information about this product is available on request. Use airtight chemical goggles and gauntlet-type gloves when handling this product. See Section 7 of the MSDS for additional information on recommended personal protective equipment.

General Information

EPA Registration Number.....3876-150

GE Betz

GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 16-JAN-2002

EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940

1 PRODUCT IDENTIFICATION

PRODUCT NAME:

SPECTRUS DT1401

PRODUCT APPLICATION AREA:

A DETOXIFYING AGENT

2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
14808-60-7	RESPIRABLE QUARTZ (CRYSTALLINE SILICA) Irritant (respiratory); probable human carcinogen (IARC=2A; NTP=anticipated); may cause long term lung disease (silicosis)

3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

CAUTION

Non-hazardous to skin. Potential eye irritant due to mechanical action only. Dusts may cause irritation to the upper respiratory tract. Inhalation may result in shortness of breath and reduced pulmonary function.

DOT hazard is not applicable
Emergency Response Guide is not applicable
Odor: None; Appearance: Gray To Brown, Granules

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media:

dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Non-hazardous to skin.

ACUTE EYE EFFECTS:
Potential eye irritant due to mechanical action only.

ACUTE RESPIRATORY EFFECTS:
Primary route of exposure;Dusts may cause irritation to the upper respiratory tract. Inhalation may result in shortness of breath and reduced pulmonary function.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:
Prolonged or repeated exposures may cause silicosis and may increase risk of cancer.

MEDICAL CONDITIONS AGGRAVATED:
Respiratory ailments.

SYMPTOMS OF EXPOSURE:
Inhalation of the dust may cause irritation to the upper respiratory tract and create breathing difficulties such as shortness of breath.

4 FIRST AID MEASURES

SKIN CONTACT:
Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:
Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists after flushing.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. *Do not induce vomiting. Immediately contact physician.* Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
No special instructions

5 FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:
> 200F > 93C P-M(CC)

6 ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7 HANDLING & STORAGE

HANDLING:
Normal chemical handling.

STORAGE:
Keep containers closed when not in use. Keep dry.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

RESPIRABLE QUARTZ (CRYSTALLINE SILICA)
PEL (OSHA): 0.1 MG/M3
TLV (ACGIH): 0.05 MG/M3 RESPERABLE FRACTION

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

SKIN PROTECTION:
rubber gloves-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
safety glasses

9 PHYSICAL & CHEMICAL PROPERTIES

Density	58.000 lb/cu.	Vapor Pressure (mmHG)	< 1.0
Freeze Point (F)	NA	Vapor Density (air=1)	< 1.00
Freeze Point (C)	NA		
Viscosity(cps 70F,21C)	NA	% Solubility (water)	0.0

Odor	None
Appearance	Gray To Brown
Physical State	Granules
Flash Point P-M(CC)	> 200F > 93C
pH 5% Susp. (approx.)	8.8
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

10 STABILITY & REACTIVITY

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
Thermal decomposition (destructive fires) yields elemental oxides.
INTERNAL PUMPOUT/CLEANOUT CATEGORIES:
"B"

11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >2,000 mg/kg
NOTE - Estimated value
Dermal LD50 RABBIT: >2,000 mg/kg
NOTE - Estimated value

12 ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY
Daphnia magna 48 Hour Static Screen
No Effect Level= 2000 mg/L

BIODEGRADATION
No Data Available.

13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 TRANSPORT INFORMATION

DOT HAZARD: Not Applicable
UN / NA NUMBER: Not applicable
DOT EMERGENCY RESPONSE GUIDE #: Not applicable

15 REGULATORY INFORMATION

TSCA:
All components of this product are listed in the TSCA inventory.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds

POTABLE WATER APPROVAL:
NSF certified. Maximum use 200 mg/L

FOOD AND DRUG ADMINISTRATION:
21 CFR 176.170 (components of paper and paperboard in contact with aqueous and fatty foods)

SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic)

SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:
This product contains these chemicals known to the state of California to cause cancer or reproductive toxicity:

CAS#	CHEMICAL NAME
14808-60-7	RESPIRABLE QUARTZ (CRYSTALLINE SILICA)

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	0	Minimal Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	A	Safety Glasses

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	21-JUL-1997		** NEW **
	15-JAN-1998	15	21-JUL-1997
	18-MAY-1998	15	15-JAN-1998
	19-MAR-2001	4	18-MAY-1998
	17-MAY-2001	8	19-MAR-2001
	16-JAN-2002	15	17-MAY-2001

GE Betz Fact Sheet

Spectrus™ DT1404
Detoxifying Agent Halogen Neutralizer

- Reduces or eliminates residual halogens
- Assists in compliance of NPDES halogen discharge limitations
- Ammonia free
- Cost effective
- Neutralizes a number of non-oxidizers

DESCRIPTION AND USE

GE Betz DT1404 is an aqueous product designed to detoxify residual halogens as well as certain non-oxidizing biocides in once-through, open recirculating cooling systems, and plant effluents. GE Betz DT1404 reacts more rapidly with halogens and non-oxidizing biocides than with oxygen. GE Betz DT1404 is a reducing agent that does not contribute ammonia to the effluent water system. By minimizing residual halogens, GE Betz DT1404 can assist in complying with NPDES discharge regulations.

TYPICAL APPLICATION

Many systems control microbiological growth by maintaining a free or total halogen residual. As a result of increasing environmental concerns and regulations regarding the toxicity of residual oxidants in effluent water, more active methods must be taken to reduce discharge of these compounds. Dehalogenation is often necessary to remove residual oxidants before discharging into a sensitive environment where halogens pose a danger to aquatic species. DT1404 reduces or eliminates residual halogen levels in effluent waters.

TREATMENT AND FEEDING REQUIREMENTS

Dosage - Feed 5 mg/L of GE Betz DT1404 for every 1 mg/L of residual halogen. This feed rate is constant over a pH range of 6.0 to 9.0.

Feed point - GE Betz DT1404 should be fed to a point in the system where it will be rapidly mixed with the bulk water or discharge. The detoxification reaction is almost instantaneous.

Dilution - GE Betz DT1404 should be fed neat.

Feed Equipment - Tanks, pumps, piping, and valves should be made of polyethylene, polypropylene or PVC. Mild steel and stainless steel are not acceptable for use with this product.

SAFETY PRECAUTIONS

A Material Safety Data Sheet containing detailed information about this product is available upon request.

PACKAGING INFORMATION

GE Betz DT1404 is available in a wide variety of customized containers and delivery methods. Contact your GE Betz representative for details.

PFC 884 0211

GE Water & Process Technologies

Material Safety Data Sheet

Issue Date: 12-FEB-2009
Supercedes: 10-DEC-2007

SPECTRUS CT1300

1 Identification

Identification of substance or preparation
SPECTRUS CT1300

Product Application Area
Water-based microbial control agent.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 12-FEB-2009

2 Hazard(s) identification

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Potential skin sensitizer. Corrosive to the eyes. Vapors, gases, mists and/or aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to skin, Flammable
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide or foam--Avoid water if possible.

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin. Potential skin sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Vapors, gases, mists and/or aerosols may cause irritation to upper

respiratory tract.

INGESTION EFFECTS:
Toxic;
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause CNS depression, tissue narcoses, skin sensitization, and/or toxicity to the liver and kidney.

MEDICAL CONDITIONS AGGRAVATED:
Not known.

SYMPTOMS OF EXPOSURE:
Inhalation of vapors/mists/aerosols may cause eye, nose, throat and lung irritation. Skin contact may cause severe irritation or burns.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range(w/w%)
68424-85-1	(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE Corrosive (eyes and skin);toxic (by ingestion)	40-70
64-17-5	ETHYL ALCOHOL Flammable liquid; irritant (eyes); may cause CNS depression; potential liver, kidney, brain, heart and male reproductive toxin; produced mutagenic effects in germ cells and somatic cells (in vivo)	7-13

4 First-aid measures

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive

victim. Dilute contents of stomach. Induce vomiting by one of the standard methods. Immediately contact a physician.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide or foam--Avoid water if possible.

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen, hydrogen chloride

FLASH POINT:

130F 54C P-M(CC)

MISCELLANEOUS:

Corrosive to skin, Flammable
UN 2920;Emergency Response Guide #132

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Remove ignition sources. Flush area with water. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

7 Handling and storage

HANDLING:

Combustible. Corrosive to skin and/or eyes.

STORAGE:

Keep containers closed when not in use. Keep away from flames or sparks. Bond containers during filling or discharge when performed at temperatures at or above the product flash point. Shelf life 360 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

CHEMICAL NAME

(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ETHYL ALCOHOL

PEL (OSHA): 1,000 PPM
TLV (ACGIH): 1,000 PPM

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use organic vapor cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:
gauntlet-type rubber, butyl or neoprene gloves, chemical resistant apron -- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 Physical and chemical properties

Specific Grav.(70F,21C)	0.965	Vapor Pressure (mmHG)	44.0
Freeze Point (F)	-7	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-22		
Viscosity(cps 70F,21C)	73	% Solubility (water)	100.0

Odor		Mild
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	130F 54C
pH As Is (approx.)		8.9
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		ND

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:
Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

INCOMPATIBILITIES:
May react with strong oxidizers.

DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, hydrogen chloride

11 Toxicological information

Oral LD50 RAT: 445 mg/kg
Dermal LD50 RABBIT: >1,800 mg/kg
Skin Sensitization G.PIG: NEGATIVE
NOTE - Active component was neither a photoallergen nor a skin sensitizer

12 Ecological information

AQUATIC TOXICOLOGY

Annelida(Lumbriculus variegatus) 96 Hour Acute Toxicity
LC50= 1.47; LC10= .37 mg/L
Benthic Crustacean(Gammerus pseutolimnaeus) 96 Hour Acute Toxicity
LC50= .07 mg/L
Ceriodaphnia 48 Hour Static Renewal Bioassay
LC50= .35; No Effect Level= .15 mg/L
Ceriodaphnia 7 Day Chronic Bioassay
IC25 = .098 mg/L
Channel Catfish 96 Hour Acute Toxicity
LC50= .86; No Effect Level= .54 mg/L
Daphnia magna 48 Hour Flow-Thru Bioassay
LC50= .04; No Effect Level= .026 mg/L
Daphnia magna 48 Hour Static Acute Bioassay
LC50= .11; No Effect Level= .06 mg/L
Daphnia pulex 48 Hour Static Renewal Bioassay
LC50= .05; No Effect Level= .031 mg/L
Fathead Minnow 7 Day Chronic Bioassay
IC25 = .259 mg/L
Fathead Minnow 96 Hour Flow-Thru Bioassay
LC50= .72; No Effect Level= .41 mg/L
Freshwater Snail(Physa sp.) 96 Hour Acute Toxicity
LC50= .46; No Effect Level= .36 mg/L
Menidia beryllina (Silversides) 96 Hour Flow-Thru Bioassay
LC50= .62; No Effect Level= .35 mg/L
Midge larvae (Chironomus tentans) 96 Hour Acute Toxicity
LC50= .5; No Effect Level= .13 mg/L
Mysid Shrimp 96 Hour Flow-Thru Bioassay
LC50= .16; No Effect Level= .03 mg/L
Rainbow Trout 96 Hour Flow-Thru Bioassay
LC50= 2; No Effect Level= 1.2 mg/L
Sheepshead Minnow 96 Hour Flow-Thru Bioassay
LC50= 1.76; No Effect Level= 1 mg/L

No Data Available.

BIODEGRADATION

BOD-28 (mg/g): 156
BOD-5 (mg/g): 43
COD (mg/g): 1470
TOC (mg/g): 380

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Exempt D001 per 40 CFR 261.21(a)(1).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD: Corrosive to skin, Flammable
PROPER SHIPPING NAME: CORROSIVE LIQUIDS, FLAMMABLE, N.O.S.(QUATERNARY AMMONIUM COMPOUNDS, ETHYL ALCOHOL)
8(3), UN 2920, PG II
DOT EMERGENCY RESPONSE GUIDE #: 132
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:
This is an EPA registered biocide and is exempt from TSCA inventory requirements.
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):
No regulated constituent present at OSHA thresholds
FIFRA REGISTRATION NUMBER:
3876- 149
FOOD AND DRUG ADMINISTRATION:
21 CFR 176.300 (slimicides for wet end use)
When used in this specified application, all ingredients comprising this product are authorized by FDA for the manufacture of paper and paperboard that may contact aqueous and fatty foods as per 21 CFR 176.170(a)(4).
NSF Registered and/or meets USDA (according to 1998 Guidelines):
Registration number: Not Registered
G5, G7
SARA SECTION 312 HAZARD CLASS:
Immediate(acute);Delayed(Chronic);Fire
SARA SECTION 302 CHEMICALS:
No regulated constituent present at OSHA thresholds
SARA SECTION 313 CHEMICALS:
No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):
No regulated constituents present

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		CODE TRANSLATION
Health	3	Serious Hazard
Fire	2	Moderate Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	18-NOV-1997		** NEW **
	27-FEB-1998	15	18-NOV-1997
	15-MAY-1998	2	27-FEB-1998
	20-MAY-1998	11	15-MAY-1998
	17-AUG-1998	15	20-MAY-1998
	27-OCT-1998	;EDIT:9	17-AUG-1998
	12-NOV-1998	;EDIT:9	27-OCT-1998
	03-MAY-2000	12	12-NOV-1998
	05-JUL-2001	12	03-MAY-2000
	24-SEP-2001	3,4,5,7,8,14,16	05-JUL-2001
	16-NOV-2001	12	24-SEP-2001
	30-DEC-2005	13;EDIT:15	16-NOV-2001
	19-DEC-2006	13;EDIT:15	30-DEC-2005
	05-APR-2007	2	19-DEC-2006
	10-DEC-2007	5,7,8,10	05-APR-2007
	12-FEB-2009	12	10-DEC-2007

GE
Water & Process Technologies

Fact Sheet

Spectrus* CT1300

Mollusk Control Agent

- Controls common fouling mollusks at all life stages using brief (6 to 24 hr) seasonal applications
- Effective on all types of fresh and salt water clams, mussels, and oysters
- Can be rapidly detoxified and is readily biodegradable
- Field test methods available for determining product concentrations

Description and Use

Spectrus CT1300 is an environmentally friendly,* bio-control agent that can be used to control mollusks in a variety of industrial, water-based systems. Spectrus CT1300 can also be used for control of algae, bacteria, and fungal slimes in these same water systems. Spectrus CT1300 is concentrated. It contains 50% of quaternary ammonium hydrochloride (Quat) as active ingredient.

Spectrus CT1300, applied in brief (6 to 24 hr) seasonal applications, is effective against all mollusks at all life stages. Spectrus CT1300 is effective against adult organisms and will prevent immature forms from growing to a fouling size.

Spectrus CT1300 is EPA-approved for use in recirculating cooling systems, heat exchange systems, and evaporative condensers. This product is also approved for use in once-through cooling systems, service water, auxiliary water, and fire protection systems, as well as influent and wastewater systems. See the Spectrus CT1300 product label for a complete listing of approved end-uses.

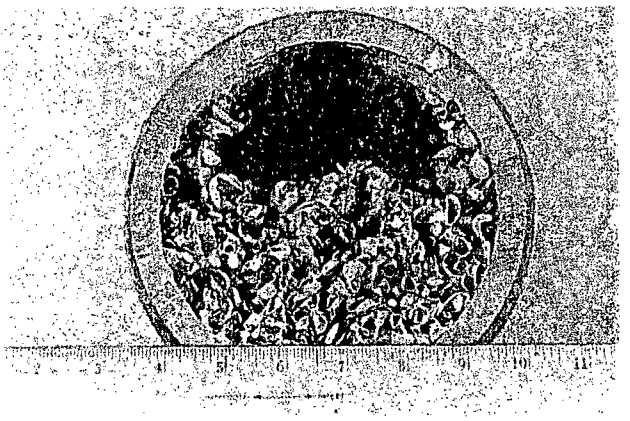


Figure 1: Zebra Mussel Accumulation after 3 Months in a 6-in. (15.2 cm) Diameter Discharge Line.

Control of macrofouling organisms such as mollusks is needed to prevent blocked water lines and damaged equipment. Uncontrolled growth of macrofouling organisms can lead to higher maintenance and production costs, reduced plant safety, and even plant outages. Therefore, an effective macrofouling control is necessary for operating units to achieve profitability goals. More importantly, effective macrofouling control is essential to ensure availability of fire protection systems and other safety-related equipment.

Environmental Benefits

The active ingredient in Spectrus CT1300 (Quat) is short-lived in the environment. Quats are cationic and rapidly adsorbed by natural, anionic substrates and sediments. Adsorption effectively detoxifies Quats and renders them harmless to aquatic and benthic organisms as well as microbes.

Find a contact near you by visiting www.ge.com/water or e-mailing custhelp@ge.com.

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Asia/Pacific
Shanghai, China
+86 (0) 411-8366-6489

Spectrus CT1300 can be deliberately detoxified by use of highly adsorbent, anionic materials such as those found in Spectrus DT1400 or DT1401. These products may be used where natural adsorption is not adequate to comply with water quality criteria. Once adsorbed, Quats are readily biodegraded to carbon dioxide and water.

Because Spectrus CT1300 provides macrofouling control in just a few hours, it reduces chemical consumption, environmental impact and treatment costs compared to halogen-based macrofouling treatments. When halogens are used for mollusk control, they must be applied continuously for several weeks if they are to be effective, and they must be dehalogenated. In addition, continuous feed of halogens promotes formation of undesirable by-products such as trihalomethanes (THMs), total organic halides (TOX), and adsorbable halogenated organics (AOX). Since Spectrus CT1300 is not an oxidizer, it does not produce these compounds.

Treatment and Feeding Requirements

Correct treatment levels and frequency of Spectrus CT1300 addition depend on many factors. These include, but are not limited to, degree of infestation, type of mollusk, temperature, system retention time, and discharge environment. Heavy infestations of mollusks should be physically removed by vacuuming, dredging, or scraping prior to treatment. Consult your GE representative for technical advice on your specific application.

Feed point - Apply Spectrus CT1300 to a point in the system where turbulence and flow patterns assure good mixing with the water being treated.

Dilution - This product is best fed neat (undiluted) from the storage container.

Feed Equipment - Spectrus CT1300 is compatible with the following materials of construction: Hastalloy 825; High Density Cross-linked Polyethylene; Teflon; PVC; Neoprene; Buna N; Buna S; Litharge Viton; Ethylene Propylene Resin; Hypalon. (Teflon and Viton are registered trademarks of DuPont.)

Avoid use of: 304 and 316 Stainless Steels (especially in thin walled feed lines); High Density Polypropylene; Linear High Density Polyethylene; Nylon.

This product may be fed using the PaceSetter* control system.

General Properties

Physical properties of Spectrus CT1300 are shown on the Material Safety Data Sheet, a copy of which is available on request.

Packaging Information

Spectrus CT1300 is a liquid and is available in a wide variety of containers and delivery methods, including GE's ChemSure* Drumless Delivery Services

Storage

Protect from extreme temperatures. Protect from freezing. Keep containers closed when not in use. Keep away from flames or sparks.

Safety Precautions

Use of eye protection (goggles and face shield) and gauntlet-type neoprene gloves is required when handling this product. See section 7 of the MSDS for additional information on recommended personal protective equipment.

General Information

EPA Registration Number.....3876-149

Purchase of Spectrus CT1300 from GE includes a license to practice the process covered by U.S. Patent 4,857,209.

GE
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 01-MAY-2007
Supercedes: 01-MAY-2007

SPECTRUS NX1104

1 Identification

Identification of substance or preparation
SPECTRUS NX1104

Product Application Area
Water-based microbial control agent.

Company/Undertaking Identification
GE Betz, Inc.
4636 Somerton Road
Trevose, PA 19053
T 215 355-3300, F 215 953 5524

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 01-MAY-2007

2 Hazard(s) identification

****

EMERGENCY OVERVIEW

DANGER

Corrosive to skin. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin, Combustible
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

****

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:
Prolonged or repeated exposures may cause CNS depression, primary irritant dermatitis, skin sensitization, tissue necrosis, and/or toxicity to the liver and kidney.

MEDICAL CONDITIONS AGGRAVATED:
Pre-existing skin disorders.

SYMPTOMS OF EXPOSURE:
Inhalation of vapors/mists/aerosols may cause eye, nose, throat and lung irritation. Skin contact may cause severe irritation or burns.

3 Composition / information on ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range(w/w%)
68424-85-1	(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE Corrosive (eyes and skin);toxic (by ingestion)	7-13
13590-97-1	DODECYLGUANIDINE HYDROCHLORIDE (DGH) Corrosive	3-7
67-63-0	ISOPROPYL ALCOHOL Flammable liquid; chronic overexposure may cause liver and kidney toxicity	1-5
64-17-5	ETHYL ALCOHOL Flammable liquid; irritant (eyes); may cause CNS depression; potential liver, kidney, brain, heart and male reproductive toxin; produced mutagenic effects in germ cells and somatic cells (in vivo)	1-5

4 First-aid measures

SKIN CONTACT:
URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:
URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:
If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:
Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:
Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:
Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:
dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, hydrogen chloride, ammonia and volatile amines

FLASH POINT:
150F 66C P-M(CC)

MISCELLANEOUS:
Corrosive to skin, Combustible
UN 3265;Emergency Response Guide #153

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:
Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Remove ignition sources. Flush area with water. Spread sand/grit.

DISPOSAL INSTRUCTIONS:
Water contaminated with this product may be sent to a sanitary sewer treatment facility,in accordance with any local agreement,a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

7 Handling and storage

HANDLING:
Combustible. Do not use around sparks or flames. Bond containers during filling or discharge when performed at temperatures at or above the product flash point.

STORAGE:
Keep containers closed when not in use. Keep away from flames or sparks. Bond containers during filling or discharge when performed at temperatures at or above the product flash point. Shelf life 270 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

CHEMICAL NAME

(C12-16)ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

DODECYLGUANIDINE HYDROCHLORIDE (DGH)
PEL (OSHA): NOT DETERMINED
TLV (ACGIH): NOT DETERMINED

ISOPROPYL ALCOHOL
PEL (OSHA): 400 PPM(500PPM-STEL)
TLV (ACGIH): 200 PPM(400PPM-STEL)

ETHYL ALCOHOL
PEL (OSHA): 1,000 PPM
TLV (ACGIH): 1,000 PPM

ENGINEERING CONTROLS:
Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:
Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:
A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.
If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges and dust/mist prefilters.

SKIN PROTECTION:
gauntlet-type butyl or rubber gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:
splash proof chemical goggles, face shield

9 Physical and chemical properties

Specific Grav.(70F,21C)	0.989	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	28	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity(cps 70F,21C)	25	% Solubility (water)	100.0

Odor		Mild
Appearance		Colorless To Yellow
Physical State		Liquid
Flash Point	P-M(CC)	150F 65C
pH As Is (approx.)		3.4
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		4.3

NA = not applicable ND = not determined

10 Stability and reactivity

STABILITY:
Stable under normal storage conditions.
HAZARDOUS POLYMERIZATION:
Will not occur.
INCOMPATIBILITIES:
May react with strong oxidizers.
DECOMPOSITION PRODUCTS:
oxides of carbon and nitrogen, hydrogen chloride, ammonia and volatile amines

11 Toxicological information

Oral LD50 RAT:	>1,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay
LC50= .16; No Effect Level= .1 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 2.9; No Effect Level= 1 mg/L

BIODEGRADATION

BOD-28 (mg/g): 24
BOD-5 (mg/g): 9
COD (mg/g): 482
TOC (mg/g): 103

13 Disposal considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

14 Transport information

DOT HAZARD:	Corrosive to skin, Combustible
PROPER SHIPPING NAME:	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(DODECYLGUANIDINE HYDROCHLORIDE) 8, UN 3265, PG II

DOT EMERGENCY RESPONSE GUIDE #: 153
Note: Some containers may be DOT exempt, please check BOL for exact container classification

15 Regulatory information

TSCA:

This is an EPA registered biocide and is exempt from TSCA inventory requirements.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

FIFRA REGISTRATION NUMBER:

3876- 145

FOOD AND DRUG ADMINISTRATION:

The ingredients in this product are approved by FDA under 21 CFR 176.300.

NSF Registered and/or meets USDA (according to 1998 Guidelines):

Registration number: 141061

Category Code(s):

G5 Cooling and retort water treatment products - all food processing areas

G7 Boiler treatment products - all food processing areas/nonfood contact

SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic);Fire

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

16 Other information

HMIS vII		**CODE TRANSLATION**
Health	3	Serious Hazard
Fire	2	Moderate Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles,Face Shield,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	16-OCT-1997		** NEW **
	02-DEC-1997	15	16-OCT-1997
	15-MAY-1998		02-DEC-1997

19-MAY-1998	15	15-MAY-1998
05-APR-2007	2	19-MAY-1998
01-MAY-2007	4,5,7,8,10,15	05-APR-2007

BENTONITE PERFORMANCE MINERALS

MATERIAL SAFETY DATA SHEET

NATIONAL® Bentonite

Revision Date: February 25, 2002

1. PRODUCT COMPANY AND IDENTIFICATION

Product Trade Name:	**NATIONAL® Bentonite**	
Generic Description:	Wyoming Bentonite, Sodium montmorillonite	CAS# 1302-78-9
Supplier:	Bentonite Performance Minerals 410 17th Street, Suite 405 Denver, Colorado 80202-4447	
Telephone:	(303) 571-8240	
Fax Number:	(303) 571-8280	
Chemtrec Emergency Number:	(800) 424-9300	

2. COMPOSITION/INFORMATION ON THE COMPONENTS

MATERIAL OR COMPONENT			ACGIH-TLV-TWA	OSHA PEL-TWA
Wyoming Bentonite, Sodium Montmorillonite				
	(60-100%)	CAS # 1302-78-9	not applicable	not applicable
Crystalline Silica				
Quartz	(1-5%)	CAS#14808-60-7	0.05 mg/m^3	(10mg/m^3)/(%SiO_2+2)
Cristobalite	(0-1%)	CAS#14464-46-1	0.05 mg/m^3	1/2x(10mg/m^3)/(%SiO_2+2)
Tridymite	(0-1%)	CAS#15468-32-3	0.05 mg/m^3	1/2x(10mg/m^3)/(%SiO_2+2)

More restrictive exposure limits may be enforced by some states, agencies, or other authorities.

3. HAZARD IDENTIFICATION

Hazard Overview:

CAUTION! - ACUTE HEALTH HAZARD
May cause eye and respiratory irritation

DANGER! - CHRONIC HEALTH HAZARD
Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

This product contains quartz, cristobalite and tridymite which may become airborne without a visible cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH specified, European Standard EN 149, or equivalent respirator when using this product. Review the Material Safety Data Sheet (MSDS) for this product, which has been provided to your employer.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin	Wash with soap and water. Get medical attention if irritation persists.
Eyes	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.
Ingestion	Under normal conditions, first aid procedures are not required.
Notes to Physicians	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not determined
Flash Point/Range (C):	Not determined
Flash Point Method:	Not determined
Autoignition Temperature (F):	Not determined
Autoignition Temperature (C):	Not determined
Flammability Limits in Air-Lower (%):	Not determined
Flammability Limits in Air-Upper (%):	Not determined
Fire Extinguishing Media	All standard firefighting media.
Special Exposure Hazards	Not applicable.
Special Protective Equipment for Fire-Fighters	Not applicable
NFPA Ratings:	Health 0, Flammability 0, Reactivity 0
HMIS Ratings:	Flammability 0, Reactivity 0, Health 0*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures:	Use appropriate protective equipment. Avoid creating and breathing dust.
Environmental Precautionary Measures:	None known.
Procedure for Cleaning/Absorption	Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

7. HANDLING AND STORAGE

Handling Precautions	This product contains quartz, cristobalite and tridymite, which may become airborne without a visible dust cloud. Avoid breathing dust. Avoid creating dusty conditions. Use only with adequate ventilation to keep exposure below recommended exposure limits. Wear a NIOSH specified, European Standard EN 149, or equivalent respirator when using this product. Material is slippery when wet.

Storage Information Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use. Do not reuse empty container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

Respiratory Protection Wear a NIOSH specified, European Standard EN 149, or equivalent respirator when using this product.

Hand Protection Normal work gloves.

Skin Protection Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothes.

Eye Protection Wear safety glasses or goggles to protect against exposure.

Other Precautions None known

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Solid
Color	various
Odor	Odorless
pH	8 to 10 in 6% slurry
Specific Gravity (H_2O = 1)	2.65
Density at 20C (lb/gallon)	Not determined
Bulk Density at 20 C (lb/gal)(uncompacted)	50-70 lb/ft^3
Boiling Point/Range (F):	Not determined
Boiling Point/Range (C):	Not determined
Freezing Point/Range (F):	Not determined
Freezing Point/Range (C):	Not determined
Vapor Pressure at 20C (mm Hg)	Not determined
Vapor Density (Air = 1)	Not determined
Percent Volatiles:	Not determined
Evaporation Rate (Butyl Acetate=1)	Not determined
Solubility in Water (g/100ml)	Insoluble
Solubility in Solvents (g/ml)	Not determined
Solubility is Sea Water (g/ml)	Insoluble
VOCs (lb/gallon)	Not determined
Viscosity, Dynamic at 20C (centipoise)	Not determined
Viscosity, Kinematic at 20C (centistoke)	Not determined
Partition Coefficient/n-Octanol/water	Not determined
Molecular weight (g/mole)	Not determined

10. STABILITY AND REACTIVITY

Stability Data:	Stable
Hazardous Polymerization	Will not occur.
Conditions to Avoid	None anticipated
Incompatibility (Materials to Avoid)	Hydrofluoric acid
Hazardous Decomposition Products	Amorphous silica may transform at elevated temperatures to crystallize to tridymite (870C) or cristobalite (1470C).
Additional Guidelines	Not applicable.

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure	Eye or skin contact, inhalation.
Inhalation	Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A). Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See "Chronic Effects/Carcinogenicity subsection below).
Skin Contact	May cause mechanical skin irritation.
Eye Contact	May cause eye irritation.
Ingestion	None known.
Aggravated medical Conditions	Individuals with respiratory disease, including but not limited to asthma and bronchitis, or subject to eye irritation, should not be exposed to quartz dust.

Chronic Effects/Carcinogenicity
Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 – carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A – possible carcinogen to humans).

Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin and other internal organs) and kidney disease.

Other Information: For further information consult "Adverse Effects of Crystalline Silica Exposure" published by the American Thoracic Society Medical Section of the American Lung Association, American Journal of Respiratory and Critical Care Medicine, Volume 155, pp 761-768 (1997).

Toxicity Tests

Oral Toxicity:	Not determined
Dermal Toxicity:	Not determined
Inhalation Toxicity:	Not determined
Primary Irritation Effect:	Not determined
Carcinogenicity	International Agency for Research on Cancer (IARC) Group 1 Carcinogen (Carcinogenic to Humans)
Genotoxicity:	Not determined
Reproductive/Developmental Toxicity	Not determined

12. ECOLOGICAL INFORMATION

Mobility (Water/Air/Soil)	Not determined
Persistence/Degradability	Not determined
Bio-accumulation	Not determined

Ecotoxicological Information	
Acute Fish Toxicity:	TLM96: 10000 ppm (Oncorhynchus mykiss)
Acute Crustaceans Toxicity:	Not determined
Acute Algae Toxicity:	Not determined
Chemical Fate Information	Not determined
Other Information	Not applicable

13. DISPOSAL

Disposal Method	Bury in a licensed landfill according to federal, state and local regulations.
Contaminated Packaging	Follow all applicable national or local regulations.

14. TRANSPORTATION INFORMATION

Land Transportation	
DOT	Not restricted
Canadian TDG	Not restricted
ADR	Not restricted
Air Transportation	
ICAO/IATA	Not restricted
Sea Transportation	
IMDG	Not restricted
Other Shipping Information	
Labels:	None

15. REGULATORY INFORMATION

US Regulations	
US TSCA Inventory	All components are listed on inventory.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311/312) Hazard Class	Acute Health Hazard Chronic Health Hazard
EPA SARA(313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity For This Product	Not applicable
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.

BENTONITE PERFORMANCE MINERALS

MATERIAL SAFETY DATA SHEET

NATIONAL® Bentonite

Revision Date: February 25, 2002

California Proposition 65	The California Proposition 65 regulations apply to this product.
MA Right-To-Know Law	One or more components listed.
NJ Right-To-Know Law	One or more components listed.
PA Right-To-Know Law	One or more components listed.
Canadian Regulations	
Canadian DSL Inventory	All components listed on inventory.
WHMIS Hazard Class	D2A Very Toxic Materials (crystalline silica)

16. OTHER INFORMATION

Abbreviations

®: Registered Trademark of Halliburton Energy Services Inc.
™: Trademark of Halliburton Energy Services Inc.
N/A: Denotes no applicable information found or available
CAS#: Chemical Abstracts Service Number
ACGIH: American Conference of Governmental Industrial Hygienists
OSHA: Occupational Safety and Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
STEL: Short Term Exposure Limit
NTP: National Toxicology Program
IARC: International Agency for Research on Cancer
R: Risk
S: Safety
LC50: Lethal Concentration 50%
LD50: Lethal Dose 50%
BOD: Biological Oxygen Demand
KoC: Soil Organic Carbon Partition Coefficient

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and third party sources. This information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

MSDS Data Revised: February 25, 2002

BENTONITE PERFORMANCE MINERALS
410 17th Street, Suite 405
Denver, CO 80202-4447
Telephone (303) 571-8240
Facsimile (303) 571-8280

NALCO

MATERIAL SAFETY DATA SHEET

PRODUCT

SODIUM HYPOCHLORITE

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **SODIUM HYPOCHLORITE**

APPLICATION : INDUSTRIAL WATER TREATMENT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER : OXY
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Hypochlorite	7681-52-9	10.0 - 30.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Corrosive. May cause tissue damage. May cause sensitization by skin contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep container tightly closed and in a well-ventilated place. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
May evolve chlorine under fire conditions. Hypochlorous acid HCl

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered. Repeated or prolonged contact may cause skin sensitization.

INGESTION :
Corrosive; causes chemical burns to the mouth, throat and stomach. May cause nausea and vomiting. May cause diarrhea.

INHALATION :
Corrosive to respiratory system.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
A review of available data does not identify any symptoms from exposure not previously mentioned.

AGGRAVATION OF EXISTING CONDITIONS :
A review of available data does not identify any worsening of existing conditions.

4. FIRST AID MEASURES

EYE CONTACT :
PROMPT ACTION IS ESSENTIAL IN CASE OF CONTACT. Immediately flush eye with water for at least 15 minutes while holding eyelids open. Get immediate medical attention.

SKIN CONTACT :
Immediately flush with plenty of water for at least 15 minutes. For a large splash, flood body under a shower. Remove contaminated clothing. Wash off affected area immediately with plenty of water. Get immediate medical attention. Contaminated clothing, shoes, and leather goods must be discarded or cleaned before re-use.

INGESTION :
DO NOT INDUCE VOMITING. If conscious, washout mouth and give water to drink. Get immediate medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :
Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

5. FIRE FIGHTING MEASURES

FLASH POINT : Not flammable

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve chlorine under fire conditions. Hypochlorous acid HCl

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Flush to drain or sewer with excess water. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material.

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Do not mix with acids. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store in a cool well ventilated area away from direct sunlight. Store the containers tightly closed. Store separately from acids. Store in suitable labelled containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :

ACGIH/TLV :

Substance(s)	
Chlorine	TWA: 0.5 ppm , 1.5 mg/m3 STEL: 1 ppm , 2.9 mg/m3

OSHA/PEL :

Substance(s)	
Chlorine	TWA: 0.5 ppm , 1.5 mg/m3 STEL: 1 ppm , 3 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
If significant mists, vapors or aerosols are generated an approved respirator is recommended. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves

SKIN PROTECTION :
Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots. A full slicker suit is recommended if gross exposure is possible.

EYE PROTECTION :
Wear a face shield with chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Yellow
ODOR	Chlorine

SPECIFIC GRAVITY	1.168 - 1.268 @ 77 °F / 25 °C
SOLUBILITY IN WATER	Complete
pH (100 %)	11.3 - 13.3
FREEZING POINT	/ 0 °C
BOILING POINT	Decomposes
VAPOR PRESSURE	Same as water
VAPOR DENSITY	1.3 (Air = 1)

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Decomposes slowly.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Direct sunlight Sodium hypochlorite releases chlorine when heated above 95 degrees F. If this should occur, the drum should be properly vented. Protective equipment should be utilized to prevent eye and skin contact or exposures above the regulated level for chlorine gas.
Keep at temperature not exceeding 40 °C

MATERIALS TO AVOID :
Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Amines Organic materials and reducing agents Metals

HAZARDOUS DECOMPOSITION PRODUCTS :
Under acidic conditions: Chlorine gas, Hypochlorous acid, HCl

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Rat	5,000 mg/kg	Similar Product

Rating : Non-Hazardous

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Rainbow Trout	96 hrs	1.94 mg/l	Product
Bluegill Sunfish	96 hrs	5.3 mg/l	Product

Rating : Toxic

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	1.57 mg/l		Product

Rating : Toxic

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	HYPOCHLORITE SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1791
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	Not flammable None
DOT Reportable Quantity (per package) :	800 lbs
DOT RQ Component :	SODIUM HYPOCHLORITE

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	HYPOCHLORITE SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1791
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	821
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	HYPOCHLORITE SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1791

Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hypochlorite : *Corrosive, Oxidizer*

CERCLA/SUPERFUND, 40 CFR 117, 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance	RQ
Sodium Hypochlorite	800 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation:

Substance(s)	Citations
• Sodium Hypochlorite	Sec. 311

CLEAN AIR ACT, Sec. 111 (40 CFR 60, Volatile Organic Compounds), Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
This product contains the following substances listed in the regulation:

Sodium Hypochlorite

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
E - Corrosive Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight# (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight# CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS# CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
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